Air Pre-Construction

Permit-Streamlining

Task Force Report

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Acknowledgements

The Department of Environmental Management started its review of the Office of Air Resources Pre-construction Permit Program in November 2001. We sent letters to about fourteen interested parties and requested their help in reviewing the DEM Office of Air Resources pre-construction permitting program.

The DEM would like to express its gratitude to all the members of the environmental, consulting and regulated communities, program staff, along with and state agencies who participated in this review process. It was only through their time and energy that this report could be developed.

The recommendations of this report, for the most part, were generated work of the Task Force itself along with some analysis provided by Glen Almquist. Special thanks goes to Doug McVay, Steve Majkut and Terry Gray for their hard work in guiding the technical analysis of the Task Force and the Final Report.

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I. EXECUTIVE SUMMARY

The main problem identified by the Task Force that needs to be addressed is the issue of the DEM Pre-construction backlog and the overall time it takes to process applications. A number of the recommendations focus on this problem and include the following:

- ♦ Super Application – DEM will modify the regulations to allow facilities to submit more comprehensive permit applications including a proposed draft permit. DEM will also need to develop guidance materials along with the regulations that outlines the content of these applications. These applications will include more detailed analyses than are required for typical applications, including air quality modeling and BACT analysis. In exchange for a more comprehensive application these projects would be assigned to the first available staff person for review and processed shortly after they were received. Part of DEM's detailed review will have been conducted by the applicant and should minimize DEM's review time.
- ♦ General or Temporary Permits - DEM will develop general permits or permits by rule for small degreasers, drycleaners, emergency generators and future regulatory source categories that regulates many facilities and use technology requirements to determine compliance. DEM will amend its regulations to address temporary sources such as rental boilers or temporary generators. DEM will also evaluate self-certification opportunities that could be used in an Environmental Results Program for facilities, in lieu of general permits.
- ♦ Pre-Review of Applications - DEM should pre-review applications and categorize them, possibly into easy, medium and hard applications. Or DEM should categorize applications based on their potential to emit. The applications that pose a greater environmental or health concern should be reviewed more closely or should be required to submit a higher level of documentation. This recommendation needs further discussion. DEM will convene a working group to implement this recommendation.
- ♦ Facility-wide Permits, Emission or Process Caps- DEM is prepared to work with facilities to implement these permits and caps and believes this can be done without any revisions to its regulations. Since there has not been a demand for these permits, the program will handle these on a case by case basis. DEM is experienced in emission caps and will continue to use these caps when requested.
- ♦ DEM should examine if there should be different threshold emission rates or time-periods for sources that are intermittent emitters. Sources that are dropped from the permitting system due to a higher threshold, will be required to register with DEM.
- ♦ DEM should process applications from new sources of pollution before it works on existing sources of pollution that are filing an application after the fact.
- ♦ DEM should evaluate developing tiered application information requirements. The purpose of the tiered approach is to increase the amount of information that is submitted to DEM, thus improving application quality. More complete applications will decrease the amount of time DEM needs to review the applications. DEM staff is tasked to determine the "bright lines" between categories and would develop checklists for the tiers. Application forms would be modified to support this effort. Three possible tiers could include:
    - Applications submitted that would require a minimal amount of information to begin the review process,
    - Applications that contain more than the minimum but less information than that required by the "Super Application".
    - "Super Applications" that would include all supplementary information and analysis the DEM would otherwise develop itself, including a draft permit. These applications would receive priority review.

In order to assist the regulated community in understanding the permitting process DEM will provide or develop additional outreach tools that include the following:

- The Office of Technical and Customer Assistance will update the "Guide to Environmental Permits and Approvals" that was written in 1989. This document briefly describes the DEM review process, application information requirements and guidance on applicability requirements.
- In order to provide additional information to the regulated community, DEM will include on its website links to the major state and EPA clearinghouses along with permitting contact information in the NESCAUM states. DEM will also pursue setting up a regional BACT Clearinghouse with the NESCAUM Board of Directors.
- Starting September 1, 2002, DEM will post copies of permits, in a PDF format, on the DEM homepage. DEM will also post an index of all permits issued by the program to facilitate information requests on past permits. The program will also speak to the DEM website contact, to determine if a searchable index of BACT decisions could be installed on the DEM website.

II. INTRODUCTION

In November 2001, DEM formed the Air Pre-construction Permit Streamlining Task Force. The purpose of this Task Force was to evaluate changes to the pre-construction permitting process that can be achieved by regulatory, policy or administrative and if needed, statutory changes. The goal of the task force is to recommend ways to process permits faster and but also maintain a high level of environmental protection. This program was chosen because backlogs are frequently encountered in the application process.

The DEM Air Pre-construction Permit Streamlining Task Force consisted of members (Appendix A) of the affected regulated, environmental and consulting communities, state agencies and members of the DEM staff. One issue that was raised over the course of the Task Force was the balance of the membership of the group. Approximately fifty percent of the applications are submitted by small businesses, yet they were not represented on the Task Force. DEM tried to consider the impacts of this process on a small business. DEM is committed to continue the evaluation process and will pull together a smaller group of stakeholders to discuss tiered applications, the Super application and the pre-review of applications. DEM will contact the business community to better include a small business viewpoint in future regulatory development.

The Task Force usually met on the third Tuesday of each month from November 2001 to March 2002. The Task Force developed a list of issues to be evaluated at the first meeting. The concerns raised were grouped into seven specific areas. Appendix B is a listing of the issues of concern that were raised by the Task Force members.

A web format was used to keep all the Task Force members appraised of the process. The record of the Task Force was posted on the DEM web-site located at the following address: http://www.state.ri.us/dem/programs/ombuds/pstream/air/index.htm

III. SUMMARY OF ISSUES

During the first meeting, thirty-three concerns or comments were raised for further evaluation. These issues were then grouped into the following seven areas:

A. Review time/Backlog

The Task Force thought the overall processing time for pre-construction permits was problematical and was the most important issue that needed to be addressed. The processing time consists of two periods, i.e., the time an application remains in queue waiting to be assigned to an engineer and the actual review time. The overall processing time of minor source applications is in the neighborhood of four to seven months. Major source applications can often take up to a year to process. Businesses need to know with some certainty when a decision on a permit application will be made. Business opportunities are fluid and our permit program is not flexible enough to service this need for timely decisions.

B. Process / Efficiency

The applications are generally processed in the order they are received (first come/first served). Two exceptions to this procedure are applications that a have a Certificate of Critical Economic Concern issued by EDC and applications that are deemed priority applications by the Department. The Task Force requested that DEM look at other ways to limit the number of applications it receives by using facility-wide caps, operational flexibility, and general permits. Changes in efficiency or process and limiting the number of applications to be processed will be critical, since additional personnel resources will be difficult to fund in this fiscal climate.

C. Outreach / Web tools

The DEM permitting system relies on a Best Achievable Control Technology (BACT) analysis to determine emissions limitations. Task Force members were interested in using DEM's homepage to post BACT decisions to help them to gain certainty in DEM's latest BACT decisions.

D. Regulatory Issues

The Task Force goal was to focus on improvements in the pre-construction permit program. The group was interested in determining if there was sufficient flexibility in existing regulations to propose other alternatives. In addition the group was interested in evaluating whether the existing permitting thresholds should be increased.

E. Policy Issues

The Task Force identified the need to review the way DEM reviews applications from first in/first out to one that is based on time sensitivity or complexity. In addition the group was interested in determining if DEM BACT permits were consistent with BACT requirements that are issued in the region.

F. Administrative Issues

The Task Force suggested that DEM should increase review efficiency by improving application quality. Mechanisms to improve application quality include facilitating pre-application meetings, revision to the application forms to require a more complete application and allowing the use of electronic submissions of applications. The group also thought DEM should update its Permit Guidelines document that was last distributed in 1989.

G. Staffing

The Task Force indicated that they thought the personnel within the permitting program were professional and they were a competent group of people and were accessible. However the group was concerned about staff turnover and the number of staff assigned to the function. The group was interested in evaluating combining all air permitting functions and the consideration of having a single point of contact for more complex facilities.

IV. DISCUSSION OF ISSUES

A. Review Time / Backlog

DEM has had a backlog problem for years. There are too many applications that are submitted for review and not enough staff to review the applications. The office has only three staff employees responsible for reviewing the applications. The small number of staff coupled with a high turnover rate in these positions and the amount of time it takes to replace employees in the state system is the root cause of the current backlog. In addition, there is no excess capacity in other parts of the air-permitting program that is available to help the pre-construction permitting staff when they are short-handed.

The Task Force thought overall processing times for pre-construction permits were problematical and this issue needs to be addressed. The overall processing time consists of two periods, i.e., the time an application remains in queue waiting to be assigned to an engineer to be reviewed and the actual review time. The overall processing time of applications is in the neighborhood of four to seven months.

The overall processing time consists of two components; the time an application remains in queue to be reviewed and the actual review time of the application. According to division statistics, the queue time for 2000 was:

Time Period	Average Queue time
1/00- 3/00	84 days
4/00- 6/00	150 days
7/00- 9/00	190 days
10/00-12/00	165 days
1/01 –3/31	171 days

A typical review time is in the 30 to 60 day time-period. The average for last 30 projects was 45 days. As can be seen from above, the queue time is the reason for the long processing time.

One of the reasons for the backlog or long queue time was an increase in the number of applications that were submitted for review. In 1998 and 1999, the office received 19 and 20 applications respectively. In 2000 and 2001, the numbers of applications submitted increased to 43 and 35.

Assuming a 30-60 days review time, one staff person can process 6-12 applications per year. When fully staffed, the Office is able to process 18-36 applications per year or on average 27 applications per year. As mentioned above, the number of applications that were submitted in the last two years exceed staff capabilities.

Another reason for the increasing backlog is staff vacancies in the program. Three permitting staff members, the current staffing level for this program, can process 27 applications per year. From May 2000 to May 2001 there was one vacant position in the program, which reduced staff to two. For two months in that same time-period there was only one employee to process applications due to a temporary project reassignment.

Unlike other DEM regulatory programs, the office does not have a major problem with application quality. The information needed to process an application is set at a minimum in order to allow small businesses to easily apply for pre-construction permits. The problem is usually not information quality, but rather sufficient detail in the information provided to review the application. Once the review begins on an application, there is a lot of information transfer occurring through phone calls. The review time of an application once the review begins (typically 30-60 days), is not usually a problem.

Task Force members thought this time seemed to be longer than what they experience in other states. Staff has other permit-related duties in addition to reviewing applications. These duties include processing the following:

- ♦ Requests for modifications to existing permits
- ♦ Requests for a determination as to whether a permit is needed for a particular activity
- ♦ Air pollution control equipment registrations
- ♦ Notifications of planned changes to a facility

The group discussed what they considered an acceptable time period for a DEM permit decision. It was generally agreed that a 60-90 day period was an appropriate time frame for most permit decisions. This time frame is similar to permits that are processed in both Connecticut and Massachusetts. This time-period should be achieved throughout the year because people need certainty in the decision making process. The group understood that major permits would take longer to process, but the smaller less complex applications should be able to be processed in this time frame. Long queue times could potentially have an impact with sources siting a facility in this state.

One way to reduce DEM review time is to require applicant’s to provide more comprehensive permit applications or to provide incentives. Two proposals were discussed:

Option 1
Have facilities agree to emission limits that went beyond compliance. DEM would agree to process these applications first and the review would be expedited.

Option 2
Allow facilities to submit a more comprehensive permit application including the development of a draft permit. These applications would be put at the top of the queue and assigned to the first available staff person after they were received. Part of DEM's work would be shifted to the regulated community and DEM's need for extensive review would be reduced.

After extensive discussion the group thought Option 2 was a workable way to streamline the permit process. Members thought Option 2 was a fair process; it allowed facilities that needed priority treatment to get serviced faster, but it would require the submission of additional information. If an application was not time-sensitive the status quo might be an acceptable option, if the review time was reasonable, i.e., within 60-90 days.

Option 1 was not looked on favorably because some Task Force members thought agreeing to lower emission limits would result in the implementation of Lowest Achievable Emission Rates (LAER). Best Available Control Technology is now required and task force members did not think many facilities would want to commit to LAER.

The idea does not have to be limited to air emissions from the permitted activity. DEM will consider other environmental benefits such as reduced emissions from other activities, reduced generation of solid or hazardous waste, improvements in water discharge limits, or wetlands restoration. This concept is beyond scope of this Task Force. DEM will evaluate the prioritization of environmental permits for facilities that propose strategies that go beyond compliance as part of the Environmental Leadership Program.

A question was raised whether the Title V applications caused a backlog in the system, due to sources needing to permit processes or equipment that previously were not permitted, but should have been. DEM indicated that there were a few applications filed that resulted from the Title V process. The point was made that DEM should process applications from new sources of pollution before it works on existing sources of pollution that are filing an application after the fact.

B. Permitting Process Description

The applications are generally processed in the order they are received (first come/first served). Two exceptions to this are applications that a have a Certificate of Critical Economic Concern issued by EDC and applications that are deemed priority applications by the Department. The Task Force requested DEM to identify other ways to limit the number of applications it receives by using facility-wide caps, operational flexibility and general permits. Changes in efficiency or process will be critical since additional personnel resources will be difficult to fund in this fiscal climate.

Existing Permit Review Process

Air Pollution Control Regulation No. 9 states that the following conditions must be met if a minor source permit application is to be approved:

(1) A stationary source shall apply BACT for each pollutant it would have the potential to emit. A modification shall apply BACT for each pollutant for which there would be a net emissions increase at the stationary source. In no event shall BACT be less stringent than any applicable emission rate contained in the Department's Air Pollution Control Regulations.

(2) Emissions from the stationary source shall not cause or contribute to air pollution in violation of any applicable state or national ambient air quality standard.

(3) Emissions from the stationary source will not cause an increase in the ground level ambient concentration at or beyond the property line in excess of that allowed by Air Pollution Control Regulation No. 22 and any Calculated Acceptable Ambient Levels.

(4) A new stationary source or a modification of an existing stationary source must conduct any studies required by the Guidelines for Assessing Health Risks from Proposed Air Pollution Sources and meet the criteria therein.

(5) The stationary source will be in compliance with all applicable state or federal air pollution control rules or regulations at the time the stationary source or modification commences operation.

DEM staff takes the following steps in their evaluation of a minor source permit application:
(Appendix C is a detailed description of the DEM review process.)

1. Application/File Review
2. Quantification of Emissions
3. Determination / Confirmation that the Proposed Project is Minor
4. Determination of Applicable Regulations
5. Best Available Control Technology Evaluation
6. Air Quality Impact Analysis
7. Prepare a Permit Review document
8. Prepare a Draft Permit

C. Processing Efficiency Proposals

a. Facility-wide permits, emission caps or process caps

The group identified that queue time was the issue that needed to be addressed. The group started to discuss the impact of facility-wide permits or emission caps. Emission caps are emission limits that facilities agree to, which limit aggregate emissions for their facility over a set time. Emission caps are often short-term solutions for facilities that are emitting a limited amount of pollution. The caps may become a problem in the future when the facility experiences growth. DEM's regulatory framework may not be fast enough to meet the needs of the facility that has an emission cap and wants to increase allowable emissions under the cap.

DEM, however, does have experience in the use of emission caps and uses this approach extensively in the operating permit program. DEM staff indicated the program tries to be flexible with our regulatory approaches. DEM has allowed changes in processes if there is a reduction in emissions. DEM will also allow the capping of facility emissions that could allow more operational flexibility. This approach is a double-edged sword and some facilities prefer not to be constrained by emission caps.

Flexibility in the permitting process is a commendable goal. Facility-wide permits need to be enforceable and can result in additional monitoring or record-keeping requirements. DEM is prepared to work with facilities to implement these permits. Since there has not been a demand for these permits, the program will handle these on a case by case basis.

b. General permits

General permits, or permit by rule, is a way to streamline the permit approval process. DEM would issue general permits that detailed the regulatory requirements for a particular source category or include those same requirements in its rules. If the facility could meet these general requirements, a permit would be issued with minimal DEM review time. DEM reviewed the types of sources permitted in the FY 1997 to FY 2001 time-period. The Office of Air Resources permitted 115 projects. The breakdown of these projects is as follows.

Type of Sources Permitted	Number
Air pollution control equipment	36
Boiler	20
Emergency generator	16
Chrome plating line	5
Diesel-fired engine	4
Degreaser	3
Ethylene oxide sterilizer	3
Surface coating operation	3
Crematory	2
Asphalt plant	2
Site cleanup	2
Miscellaneous	19

Based on this analysis, DEM determined that general permits or permit by rule could be used for small degreasers, drycleaners, emergency generators and future regulatory source categories that regulates many facilities and use technology requirements to determine compliance. Model regulations or general permits, with the exceptions noted, are not useful for the other types of projects since the emission limitations are generally case by case determinations or the low volume of applications in a category does not make the general permit or permit by rule efficient. DEM will also evaluate self-certification opportunities that could be used in an Environmental Results Program for facilities, instead of general permits.

c. Phased Permit Applications

Phased permit applications, that is an application that includes a number of projects to be installed at different times, would be useful when a facility has a multi-year plan to upgrade equipment. The issue concerning phased permits is that queue time may add additional time to the review of each phase. The full project design may not be finished when the first phase of the permit is submitted to DEM. Information should be able to be added to the application that is first submitted and not have to wait in the queue again. DEM staff said supplemental information could be submitted when an application is still in the queue. It was suggested that DEM should negotiate a time-line at the beginning of the process for reviewing applications for phased projects. The facility needs to provide its time-line at the beginning of the submission for this to work. Since this is not a common occurrence, these projects will be subjected to a case-by-case review.

d. Process Predictability

The participants initially raised predictability as a problem, but it was agreed, this is not a significant problem in the pre-construction permitting program. The group discussed some problems when determining BACT, but the problem usually disappears upon application of a "top down approach".

Predictability can be an issue when an application includes air toxics. At the current time, DEM regulates forty air toxics. Each substance has an AAL associated with it. When a process emits another compound that is regulated under the Air Toxics regulation, but doesn't have an existing AAL, the applicant can not predict what the emission limitation will be since DEM will conduct a case-by-case review of the air toxic and calculate an AAL. DEM staff indicated the air toxics program is currently revising its regulations. One of the revisions is to expand the list of air toxics. This expanded list will increase the number of air toxics regulated by DEM by more than two hundred substances and this expansion may eliminate many of the predictability problems.

e. Air Permits That Impact Multiple DEM Permitting Programs

DEM currently uses the Office of Technical and Customer Assistance for coordinating permits that cross multiple environmental programs. Participants agreed that the process is working and the existing process should remain in effect.

f. Professional Engineer Prepared Applications

The Task Force discussed the possibility of allowing applications prepared by professional engineers to be expedited. The thought was that professional engineers are trained and were capable of preparing complete applications.

Professional engineers may be capable of preparing complete applications, but so could other environmental professionals who were trained and had experience in air pollution permitting. There was no guarantee that a professional engineer, who specialized in ISDS applications, for example, would have the background or experience to prepare a quality air permitting application.

g. Early Stakeholder Involvement (for permits requiring a hearing)

DEM will continue to work with applicants concerning major permits. The department will get involved with community outreach if we are requested to do so at the appropriate time in the process. There was some reluctance expressed by the department to move forward with a public process before there is a complete application and DEM is able to adequately review an application. DEM would however, participate in pre-application meetings to discuss the specific issues of a proposed application.

h. Other Suggestions

- ♦ Develop algorithms that could eliminate the need to conduct air quality modeling. (Staff mentioned that we do this to a limited degree.)
- ♦ DEM should pre-review applications and should categorize them into easy, medium and hard applications. Or DEM should categorize applications based on their potential to emit. The applications that pose a greater environmental or health concern should be reviewed more closely or should be required to submit a higher level of documentation. The director suggested a small group of people should meet to discuss this issue at greater length.

D. Outreach/Web tools

The DEM permitting system relies on a Best Achievable Control Technology (BACT) analysis to determine emission limitations. Task Force members were interested in using DEM's homepage to post BACT decisions to help them to gain certainty in DEM's latest BACT decisions.

DEM staff suggested that BACT decisions, in the form of copies of permits, would be posted monthly in a PDF format on the DEM homepage. DEM would post text describing each project that was issued a permit with a link to a PDF version of the permit itself. DEM will begin this process on June 1, 2002. DEM will post a report from its Access database that will describe past decisions. This information would be easy to post, but it may not be in a format that would be searchable. The program will, however, speak to the DEM website contact, to determine if a searchable index of BACT decisions could be installed on the DEM website. As an alternative, one participant suggested that DEM post all its BACT decisions on the EPA BACT Clearinghouse. DEM will explore this option, but indicated that the EPA format collects too much information.

In order to provide additional information to the regulated community, DEM will include on its website links to the major state and EPA clearinghouses along with permitting contact information in the other NESCAUM states. DEM will also pursue setting up a regional BACT Clearinghouse. DEM will raise this issue with the NESCAUM Board of Directors.

E. Regulatory Issues

The Task Force goal was to focus on improvements in the pre-construction permit program. The group was interested in determining if there was sufficient flexibility in existing regulations to propose other alternatives. In addition the group was interested in increasing the existing permitting thresholds.

a. Regulation Flexibility

A participant questioned if there was sufficient flexibility in the regulations to propose other alternatives. Sources should be able to propose solutions that solve the problem in another way. This point was discussed at length and the following issues should be further explored by a subgroup of the task force:

Air Pollution Control Regulation No. 9 should be amended to allow some operational flexibility. Some ideas discussed included:

- The current procedure is to require a BACT review for every new modification. Currently, similar pieces of equipment in a facility may have different levels of BACT that results in emissions being generated at different levels from equipment that is essentially the same. DEM should consider evaluating BACT from a facility standpoint and not from an individual piece of equipment standpoint. DEM cautioned that there might be increased record keeping, reporting and monitoring requirements and different emission and operational limits set on these pieces of equipment. This could be difficult to deal with and may pose operational problems for the source. (DEM staff mentioned the reason for the different BACT requirements are often due to the age of the process equipment. Newer permits/pieces of equipment will have more stringent emission limits.) DEM was willing to explore the issue of facility-wide BACT permits for minor sources.

- Clarifying when a BACT or modeling analysis is required for a new piece of air pollution control equipment that replaces an existing piece of equipment that results in a reduction in emissions.

- The group discussed the age of permits and how that might affect facility decisions. If a facility replaced a piece of equipment that was 20 years old, there is a good argument that a newer technology in either pollution control or process equipment would be available to reduce emissions. The issue may not be as clear for an operational change on the process that was recently permitted. One proposal discussed to address this issue would have DEM consider a permit that would detail the federal and state emission control parameters and allow flexibility to be built into the permit. Operational changes might trigger modeling. The results of modeling would determine if a new application would have to be submitted.

DEM staff indicated that there is some flexibility in the permitting process to address some of the operational issues that were mentioned. This, however, is not a common problem encountered.

- The regulations should allow modifications that result in lower emissions without a permit.

The group was asked if any obstacles existed in the regulations that prevented operational flexibility. One issue mentioned was the requirement in Regulation No. 9 that required filing a new permit if replacement/construction costs exceeded 50% of the original cost of construction. For air pollution sources, subject to federal standards such as NSPS or MACT standards, this is a federal requirement and there is little flexibility to change this. EPA, however is reviewing its New Source Review regulations and DEM will track this to determine where additional operational flexibility can be achieved. (Most of the state permits impact minor sources and DEM was requested to consider a change in regulations for this class of permits. It was DEM's opinion that if a company is making changes that cost more than 50% of the original cost, these changes are likely to be substantial and should be subject to permitting.

It was DEM's intention to link expedited permit processing with a company's ability to go beyond compliance. There was no support for the concept in the Task Force. One participant noted that the concept generally would be explored by larger facilities. There are not a lot of larger facilities located in Rhode Island. The mid to smaller size facilities are less interested in the concept since there are not a lot of options that work for these sources. The Director is investigating applying this concept on a regional basis.

Another obstacle for a facility to accept a permit condition that goes beyond compliance is the concern that the permit would require emission reductions greater than those required by a BACT analysis. This new emission limit may be equivalent to the Lowest Achievable Emission Rate (LAER). This approval would then set the BACT emission level for future applications and would require this level of control as BACT on subsequent proposals. The Director requested people to propose ideas on how to prevent this from happening.

b. Increased Thresholds

The Task Force wanted to evaluate the threshold levels DEM has set that requires facilities to apply for permits. If the thresholds are increased, then fewer applications will be need to be processed, and DEM's backlog will be reduced. The group also suggested a registration requirement be adopted for those sources that would not be required to file applications due to the higher threshold level.

One Task Force member researched the issue of permit thresholds in other states in the region. Based on the information he collected, the issue was more complex than anticipated and he was not able to establish a lower threshold that was used consistently throughout the region. DEM staff also evaluated permit thresholds and in general, found that DEM's threshold limits are higher than a lot of neighboring states.

A number of issues were identified that could merit further discussion:

- Should there be different threshold standards for sources that are intermittent emitters?
- DEM should re-examine the existing 10 pound / hour emission threshold, especially for sources that emit emissions over a short period of time.

- Best Management Practices for some source categories are analogous to general permits. DEM has agreed to develop general permits for certain source categories.
- DEM should review different threshold time-periods, instead of just relying on an hourly time-period. Toxicity could also be a factor when we consider changing thresholds. DEM stated that some of these issues might be addressed in its upcoming revisions to the air toxics regulations.

c. Landfill Issues

DEM would work with the RI Resource Recovery Corporation directly and evaluate our regulations to determine if they are comprehensive enough to handle and fairly treat all the problems associated with landfills, closed landfills and recyclers.

F. Policy Issues

The Task Force identified the need to review the way DEM reviews applications from a first come/first served basis to one that is based on time sensitivity or complexity. In addition the group was interested in determining if DEM BACT permits were consistent with BACT requirements that are issued in the region.

a. Application Processing Sequence

The applications are generally processed in the order they are received (first come/first served). Two exceptions to this are applications that a have a Certificate of Critical Economic Concern issued by EDC and applications that are deemed priority applications by the Department. Since 1997, there have been nine CEC projects, with only one being submitted in the last two years. These projects are put at the top of the list when they are received and assigned to the next available staff engineer. DEM was requested to review this policy and replace it with a system that is based on time sensitivity or complexity.

DEM polled the NESCAUM states to determine if they process applications using a process other than the order they are received i.e., (first in/first reviewed) and determined that all agencies use this model. The states were questioned if they had developed criteria used to decide when a permit should be taken out of order or given priority treatment. Massachusetts does have a formal application process that allows applications to be taken out of order. The process does not have a lot of firm criteria to give Rhode Island guidance if we were to adopt this procedure.

As a result of the Task Force deliberations, DEM will be modifying the way applications will be processed. The “Super Application” and general permits/permit by rule will reduce the review time for these categories of applications. The EDC process also allows projects of critical economic concern to move forward faster.

b. DEM BACT Process

DEM requires a BACT analysis to be performed on all applications where there are increases in emissions, whereas other states focus BACT requirements on major sources. A concern was raised whether DEM’s BACT determinations should be consistent with BACT requirements that are issued in the region. A lot of the pollution problems are regional and the emission requirements should be consistent throughout the area.

The Director mentioned the Task Force process would not be used to push the Department into using a least common denominator approach for BACT determinations. The group needs to evaluate obstacles in the permitting process that prevents us from meeting our goals in an efficient manner.

The DEM process for determining BACT is to check the EPA National clearinghouse, some of the major state clearinghouses like Texas, New Jersey and California and queries to permit writers in other NESCAUM states. There may be some additional independent research for a high impact major source. Most consultants can reproduce this process.

Task Force members indicated that there is a level of uncertainty on the DEM decision making process with respect to BACT determinations. DEM staff argued that there is little uncertainty if a top-down BACT analysis is performed and the facility chooses the top level of control. The top-down BACT process ranks control options on the basis of their emission controls with the most stringent control option being considered first. Each option is evaluated based on its technical feasibility, cost and energy or environmental considerations. If this BACT is not appropriate, the next most stringent control option is evaluated. The process continues until the appropriate level of BACT is determined. It was generally agreed that the nature of the BACT process would always have some uncertainty if an applicant does not want to install the control technique identified as the "best".

c. Distributed Generation

Distributed generation occurs when electricity-generating facilitates are located away from a large centralized power plant, whether those facilities are developed by a utility or the electricity user. These facilities are now being developed more often to ensure a reliable, cost-effective source of energy and/or a non-interruptible source of energy.

Distributed generation is a concern because it can result in a significant increase in emissions and number of permits to be evaluated. The Ozone Transport Commission approach lowers permit thresholds for facilities using dirty diesel engines. Cleaner distributed generation equipment may avoid permitting requirements altogether. This policy may create more permits that need to be processed. DEM should encourage the use of “clean” distributed generation sources through incentives that may include a streamlined permitting process for “clean” sources. DEM would like this issue discussed further with a small group of interested parties.

The Regulatory Assistance Project has developed a model rule for distributed generation. This model rule is expected to be finalized in June 2002. Information on this rule can be found at their website located at: http://www.rapmaine.org/

The Office of Air Resources will be following the issue of distributive generation closely and will be working with NESCAUM, the Ozone Transport Commission and states throughout the region to implement a system that encourages the use of clean energy sources. The program will consider incentives in the permitting process for clean sources of energy.

Most distributed energy policies do not include landfill gas as a source of energy. The cost of power produced by this source is generally more expensive than typical or other alternative fuels. A distributed generation policy should include performance standards as opposed to the OTC approach of lower permit thresholds for dirtier equipment and higher thresholds for cleaner burning equipment. DEM should include a member of the regulated landfill community when discussing distributed generation issues.

G. Administrative Issues

a. Permit guidelines, the DEM review process.

DEM had developed a permit guidance document that briefly reviewed all the DEM permitting processes. The "Guide to Environmental Permits and Approvals" was written in 1989 and briefly describes the DEM review process, application information requirements and guidance on applicability requirements. The Office of Technical and Customer Assistance will update this document.

The DEM Air Permitting Review process was detailed previously. A participant suggested that this review process be amended to include expected review timelines. This would allow an applicant to develop a critical path for the review process. Participants were also interested in guidance for applicability for air modeling. Air quality modeling guidance for air toxics is located in Appendix E but it is in the process of being revised. DEM will post the revised guidance on the department website when the document is finalized.

b. White Papers

More comprehensive application submissions will reduce review times. Applicants should be encouraged to provide a "white paper" prior to submitting applications that outlines the issues of the permit.

DEM encourages using any tool that improves application quality. A white paper could be useful in clarifying issues of an application. A participant suggested that the white paper could be used instead of a pre-application meeting. DEM will certainly use this information in the review process, but will not make this a requirement of the application process. The air-permitting program supports the use of pre-application meetings to clarify issues in the permit process.

c. Air Toxics Screening Modeling

DEM was requested to develop simple screening procedures for evaluating air toxics impacts. These conservative examples could be used to determine if an air quality modeling analysis is required and could provide guidance to applicants on control technology that is needed to meet requirements.

The air toxics regulation and modeling guidelines are undergoing revision. Air toxics regulation can be different from state to state and therefore screening techniques used in other states may not always be applicable for use in Rhode Island. DEM expressed a willingness to consider any techniques that members of the group were aware that other states were using.

d. Minimum Application Information Requirements

One way to reduce the time for DEM's review of air permits is to increase the minimum information required in an application. The group discussed restructuring the application package to require applicants to provide more information/analysis in their submissions. This would enhance application quality. However, half of all applications received are submitted by small sources. If DEM requires significantly more information, these sources will either have to hire consultants to prepare applications or will not submit an application. DEM's policy has been to keep the application package simple to encourage the filing of applications.

DEM works with all applicants to process their applications. Providing more information is helpful to have an application reviewed faster. DEM staff will rely on BACT reviews and modeling provided by applicants and tries to minimize the need to recreate the analysis. In some instances, especially with the smaller sources, the application content is not substantial. They will provide DEM with a minimum amount of information that is readily available to them. DEM staff then prepares other elements, such as the air quality modeling or BACT analysis, in the course of its review of the application, so that a decision can be made on the submission. There is a cost of using this approach, because DEM will spend more time with these sources as opposed to those applications that are prepared by consultants or facilities that have an environmental staff and prepare some of these other elements for inclusion in their application.

There is some information on EPA's website that could be used by smaller sources to assist in the completion of their application. The EPA site does have downloadable models that can be used to determine air quality impacts of an application. Modeling does requires a lot of training and understanding of how the model works, so this may not help a lot of sources.

Small businesses were not represented on the Task Force and DEM needed to consider their requirements in this process. The process should remain user-friendly to these categories of sources, but DEM should consider including tiered application requirements. A checklist could be developed that explains the information requirements for the tiers. Three possible tiers could include:

- Applications submitted that would require a minimal amount of information to begin the review process,
- Applications that contain more than the minimum but less information that that required by the "Super Application".
- "Super Applications" that would include all supplementary information and analysis the DEM would otherwise develop itself, including a draft permit. These applications would receive priority review.

DEM staff is tasked to determine the "bright lines" between categories and would develop checklists for the tiers. Application forms would be modified to support the tiering effort.

e. Electronic Applications

DEM's application forms can be downloaded from the website. DEM is participating in the Rhode Island Portal Project that is supportive of the state's E-Government initiatives. At this time, DEM is still in the early stages of implementing a system for accepting electronic applications. DEM is working on the ability of the public to view the status of ISDS and Wetlands Permits. This information sharing system will be expanded to other programs. Submission of electronic applications will come later. The schedule for building DEM's capability to accept electronic applications has not been developed and is contingent on the budgetary process or agreement from the company that administers the portal project that there will be sufficient traffic to fund the development of this capability. It is, however, the goal of DEM to increase our E-Government capabilities.

f. Operating Permit Program

The Operating Permits Program identifies all of the state and federal air pollution control requirements applicable to the source and includes all those requirements in an operating permit. The clarity provided by this program will assist industry, regulatory agencies, environmental groups and the public in ensuring compliance with all applicable regulatory requirements.

In Rhode Island:

- There are 51 sources that require operating permits,
- The program is funded by these sources and sources that have capped their emissions to avoid the operating permit requirement.
- The fees cover DEM's costs of the air program which include the following activities, i.e., regulation development, enforcement, program oversight, and inventory,
- Eleven full time equivalents (FTE's) are funded by the program, of which 4.4 FTE's work directly in the review and issuance of operating permits,
- The Small Business Technical Assistance Program budget funding was reduced to reflect the time staff actually spend doing air pollution technical assistance,
- Eighteen sources have been issued permits.
- The Operating Permit Advisory Commission meets on a regular basis to discuss issues of concern.

A participant questioned if DEM would still require 4.4 FTE's to run the program once all sources were permitted. DEM is required to review the permits every five years and to process request for modifications. This issue has been previously raised in the Advisory Commission and is being examined in that forum.

g. Review Times Incentives

The Task Force wanted DEM to review Massachusetts program of refunding fees if permits were not processed within a certain time-period. DEM had reviewed this issue and indicated its ability to process applications is limited by the number of employees in the program, their permit related duties and the number of applications received. DEM will implement the proposed streamlining ideas like the "Super Application, general permits, tiered application requirements etc, and determine their impacts on reducing permit backlogs. In the event these options do not reduce the queue time, DEM will then investigate other programs such as refunding fees.

H. Staffing

The Task Force indicated that they thought the personnel within the permitting program were professional and they were a competent group of people and were accessible. However the Task Force was concerned about staff turnover and the number of staff assigned to the function. The group was interested in evaluating combining all air permitting functions and the consideration of having a single point of contact for more complex facilities.

a. Single Point of Contact

The Task Force evaluated a single point of contact for more complex facilities. The Task Force members thought that once staff was familiar with the company processes, review times could decrease. DEM's staff turnover is problematic and maybe two people could work on the larger facilities.

DEM has considered having a single point of contact for more complex facilities. Although this is a good concept, the idea breaks down when one considers there are only three people in the permitting staff. If DEM were to loose the single point of contact, the experience of facility permitting would be lost. DEM will, however, manage its staff in a manner that is most efficient for reviewing permits.

b. Staff Turnover

DEM has experienced staff turnover in the past. A participant suggested DEM should hire experienced people in the program and the increased salary might be an incentive to have people remain at DEM. This is an interesting concept, but it does have a budget and an organizational impact. One participant suggested that DEM should raise fees to pay for the cost of additional staff. There was little support for this concept.

c. Staff Size.

The Task Force has made many suggestions to streamline the process and this should have a positive impact on permitting review times. The workload has been consistent through the years. DEM in comparison to the neighboring states does have a higher workload per staff member. There is need for additional staff in the program if the goal to substantially reduce processing timelines is to be achieved.

d. Combined Permitting Staffs

The Task Force requested DEM consider combining the staffs of the operating, pre-construction and air toxics section. A larger staff may be able to compensate for the existing chronic turnover problem. In addition, there may be some efficiencies of having the same person work on both Title V and pre-construction permits

DEM's permitting program is small. There is no excess capacity in any of the three programs mentioned. In some instances it might be possible to move a person from one program to another, but that would only reduce a backlog in one program at the expense of the other.

One participant suggested that DEM allow overtime work to review applications that would be paid by the applicant. DEM had been using overtime to reduce the backlog. However, this option was removed because of the state's critical fiscal position. In addition a dual track may be problematical from a policy standpoint. This is setting up a system where there are two different timelines for the sources willing to pay for increased customer service, but it will come at the expense of others who are waiting for their permits to be reviewed.

The group explored shifting resources from the Title V program to the pre-construction permitting program (or vice-versa) when there is a permit backlog. There are budgetary impediments that prevent DEM from moving personnel from one program to another. In addition, the business community that funds the operating permit program has opposed shifting people from one program to another. EPA regulations also are not flexible in allowing DEM to shift program funds around.

Other states in the region issue permits faster and will be more flexible when there is a critical need to process an application. One reason they may be faster in their reviews is that one person is responsible for all permits from a facility (pre-construction and operating) and they are more familiar with the operations of the facility. DEM will consider merging some of the responsibilities of the pre-construction and operating program when DEM issues all of the Operating Permits. There may be some flexibility in the future that will allow a reviewer to be responsible for both the pre-construction permitting and operating permit modification that occurs at an operating permit facility for a given project.

From DEM's perspective, the speed of existing reviews is tied to the number of permits that are received in a year. In the last two years DEM received more permits than it had the ability to process. Unless we change the review process or get additional resources, we will experience occasional backlogs. There is a difference between how big states and small states are able to run a permitting program. Bigger states have more flexibility to shift resources around in a program where there is a need to process a critical application. In a smaller state, where resources in any one program are limited, there is less flexibility to shift resources from one area to another.

V. TASK FORCE RECOMMENDATIONS

The Task Force identified the permitting backlog as the major problem that needs to be addressed, particularly the amount of time applications are in the queue to be assigned for review. Recommendations that will reduce the decision-making interval should be prioritized in the implementation process. Appendix C is the implementation schedule for the Task Force recommendations.

Based on the five meetings of the Task force the following regulatory, policy and administrative recommendations were made to improve the existing system.

A. Statutory Recommendations

The Task Force determined that there were no revisions needed to the state statute concerning the Air Pre-construction program.

B. Regulatory Recommendations

a. Backlog Reduction

1. Super Application – DEM will modify the regulations to allow facilities to submit more comprehensive permit applications including a proposed permit. DEM will also need to develop guidance materials along with the regulations that outlines the content of these applications. These applications will include more detailed analyses than are required for typical applications, including air quality modeling and BACT analysis. In exchange for a more comprehensive application these projects would be assigned to the first available staff person for review and processed shortly after they were received. Part of DEM's detailed review will have been conducted by the applicant and should minimize DEM's review time.

2. General Permits - DEM will develop general permits or permits by rule for small degreasers, drycleaners, emergency generators and future regulatory source categories that regulates many facilities and use technology requirements to determine compliance. DEM will amend its regulations to address temporary sources such as rental boilers or temporary generators. DEM will also evaluate self-certification opportunities that could be used in an Environmental Results Program for facilities, instead of general permits.

3. Pre-Review of Applications - DEM should pre-review applications and categorize them, possibly into easy, medium and hard applications. Or DEM should categorize applications based on their potential to emit. The applications that pose a greater environmental or health concern should be reviewed more closely or should be required to submit a higher level of documentation. This recommendation needs further discussion. DEM will convene a working group to implement this recommendation.

b. Regulation Flexibility

1. DEM should consider evaluating BACT from a facility standpoint and not from an individual piece of equipment standpoint. There may be different record keeping and monitoring requirements and different emission and operational limits set on these pieces of equipment.

2. DEM should clarify when a BACT or modeling analysis is required when a new piece of air pollution control equipment replaces an existing piece of equipment that results in a reduction in emissions.

c. Thresholds

1. DEM should examine if there should be different permit applicability thresholds for sources that are intermittent emitters.

2. DEM should review different threshold time-periods, instead of just relying on an hourly time-period. Toxicity could also be a factor when DEM considers changing thresholds.

d. Landfill Issues

1. DEM would work with the Rhode Island Resource Recovery Corporation directly and evaluate our regulations to determine if they are comprehensive enough to handle and fairly treat all the air quality permitting issues associated with landfills, closed landfills and recyclers.

C. Policy Recommendations

a. Application Processing Sequencing

1. DEM should process applications from new sources of pollution before it works on existing sources of pollution that are filing an application after the fact.

D. Administrative Recommendations

a. Processing Efficiency

1. Phased Permitting - DEM should negotiate a time-line at the beginning of the process for reviewing an application for phased permits. The facility needs to provide its time-line at the beginning of the submission for this to work.

b. Review Process

1. DEM will convene a small group of people and evaluate the following recommendations and report their findings to the Director in six months:

   i. DEM should review the "first come/first served" policy. The following criteria, at a minimum, should be evaluated for a system other than first come/first served: the difficulty in reviewing the application, the potential to emit, and the level of environmental and/or public health concern.

   ii. DEM should evaluate developing tiered application information requirements. The purpose of the tiered approach is to increase the amount of information that is submitted to DEM, thus improving application quality. More complete applications will decrease the amount of time DEM needs to review the applications. DEM staff is tasked to determine the "bright lines" between categories and would develop checklists for the tiers. Application forms would be modified to support this effort. Three possible tiers could include:

- Applications submitted that would require a minimal amount of information to begin the review process,
- Applications that contain more than the minimum but less information that that required by the “Super Application”.
- “Super Applications” that would include all supplementary information and analysis the DEM would otherwise develop itself, including a draft permit. These applications would receive priority review.

2. DEM currently uses the Office of Technical and Customer Assistance for coordinating permits that cross multiple environmental programs. Participants agreed that the process is working and the existing process should remain in effect.

3. Facility-wide Permits, Emission or Process Caps- DEM is prepared to work with facilities to implement these permits and caps and believes this can be done without any revisions to its regulations. Since there has not been a demand for these permits, the program will handle these on a case by case basis. DEM is experienced in emission caps and will continue to use these caps when requested.

4. The air-permitting program supports the use of pre-application meetings to clarify issues in the permit process.

E. Outreach /Web Tools

a. The Office of Technical and Customer Assistance will update the “Guide to Environmental Permits and Approvals” that was written in 1989 and briefly describes the DEM review process, application information requirements and guidance on applicability requirements.

b. In order to provide additional information to the regulated community, DEM will include on its website links to the major state and EPA clearinghouses along with permitting contact information in the other NESCAUM states. DEM will also pursue setting up a regional BACT Clearinghouse. DEM will raise this issue with the NESCAUM Board of Directors.

c. Starting September 1, 2002, DEM will post copies of permits, in a PDF format, on the DEM homepage. DEM will also post an index of all permits issued by the program to facilitate information requests on past permits. The program will also speak to the DEM website contact, to determine if a searchable index of BACT decisions could be installed on the DEM website.

d. Air modeling guidance is in the process of being revised. DEM will post the revised guidance on the department website when the document is finalized.

e. DEM will evaluate when Pre-construction applications will be able to be submitted in an electronic format.

Appendix A -Task Force Roster

Appendix A Air Pre-construction Permit Streamlining Task Force Roster					
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Appendix B – Task Force Issues of Concern

Appendix B **Task Force Issues of Concern**	
No.	**Issue**
	Backlog
1	*****The backlog / queue is a problem and it is not always possible to predict when an application will be approved. Certainty of a decision date is important.
2	*Timing is an important issue with businesses. Business opportunities are often lost when permit decisions are not made in a timely manner. Business opportunities are fluid and our permit program is not flexible enough to service this need for timely decisions.
3.	Major source permits can take up to a year to process. DEM should consider using consultants to pay for the permit reviews. This dual track may be problematical from a policy standpoint and needs more discussion. This is setting up a system where there are two different timelines for the sources willing to pay for increased customer service, but it will come at the expense of others who are waiting for their permits to be reviewed.)
4.	Hire additional help to reduce backlog, perhaps by using on-call consultants to work on permit applications.
5.	Three DEM proposals were quickly discussed concerning ways to reduce the backlog and included the following: a.) Development of a super application where an applicant, after a pre-application meeting develops a permit application including a draft permit that exceeds existing regulatory requirements. These applications would by-pass staff review and would be reviewed directly by Doug McVay. b) .Development of general permits. Suggested categories would be small degreasers, drycleaners, and emergency generators. c.) Develop a list of consultants who can be used to review applications submitted to DEM. If the permits were time sensitive the applicant would pay for the cost of the external review.
II	**Process / Efficiency**
1.	***Go to facility-wide permits, emission caps or process caps. This will allow for increased operational flexibility and may even eliminate the need for some permits. (DEM staff mentioned this issue is being discussed at the national level and we may need to follow federal guidance in this matter if federal limits are involved. There may be room for some additional state regulatory flexibility.)
2.	***DEM should use permits by rule for some non-permanent activities such as spill mitigation control devices, temporary pollution sources such as boilers, emergency generators etc.
3.	A provision should be incorporated in the queue process to address the issue of phased permits. In some instances there is insufficient information available to provide DEM all the information necessary to process a complete application. But there is enough information to process the early phase. How does DEM handle the later phases of the project, as a new application or an addendum to the existing application?
4.	*The process should not compromise environmental standards.
5.	Predictability of the process should be improved.
6.	The DEM permit review process for projects that affect multiple environmental programs should be evaluated.
7.	The permit review process in DEM is good.
8.	Consider giving more weight to applications provided by a professional engineer. Allow these applications to move through the process faster than those not submitted by a professional engineer.
9.	Stakeholder involvement early in the process should be encouraged especially when a permit requires a hearing.
III.	Outreach / Web tools
1.	Publish BACT decisions quickly on the DEM homepage.
2.	Make better use of the web for posting precedents and generic examples of typical applications. Install examples of BACT/LAER for some typical sources like boilers.

Appendix B

Issues of Concern

No.	Issue
IV.	**Regulatory Issues**
1.	There is not sufficient flexibility in the regulations to propose other alternatives. Sources should be able to propose solutions that solve the problem in another way and take credit for going beyond compliance.
2.	We should evaluate our regulations to determine if they are comprehensive enough to handle and fairly treat all the problems associated with landfills, closed landfills and recyclers.
3.	Increase the permit thresholds and require registration for those sources that have dropped out of the permitting program
V.	**Policy Issues**
1.	DEM BACT permits should be consistent with BACT requirements that are issued in the region. A lot of the pollution problems are regional and the emission requirements should be consistent throughout the area.
2.	The director mentioned an interest in developing an approach for handling distributed generation permits that would encourage clean generation.
3.	Change the way DEM processes applications from first in / first out to one that is based on time sensitivity or complexity.
VI.	**Administrative Issues**
1.	Update the permit guidelines, definitions and **develop a flow chart of the DEM review process.
2.	Improvement of the application quality can help review times. *Pre-application meetings are useful in determining application requirements. It was also noted that DEM encourages and participates in pre-application meetings. Applicants should be encourage to provide a “white paper” prior to submitting an applications that outlines the issues of the permit.
3.	*****DEM should develop simple screening procedures for air toxics applications. These conservative examples could be used to determine if an application is required and could provide guidance to applicants on control technology that is needed to meet requirements.
4.	Revise the application package to include all information needed to process the application.
5.	Allow for the use of electronic forms in the application process.
6.	DEM was requested to provide information on operating permit fees such as whom does the fees fund at DEM? How are the funds managed? Do they fund Title V compliance inspections?
VII.	**Staffing**
1.	Consider having a single point of contact for more complex facilities. Once people are familiar with the company processes, review times could decrease. DEM’s staff turnover is problematic and maybe two people could work on the larger facilities.
2.	Staff access on short notice is fine.
3.	Staff turnover needs to be addressed. Experienced staff will process applications quicker.
4.	The number of staff is insufficient to process the existing workload.
5.	Consider combining the staffs of the operating, pre-construction and air toxics section. A larger staff may be able to compensate for the existing chronic turnover problem. In addition there may be some efficiencies of having the same person work on both Title V and pre-construction permits.

Appendix C – DEM Minor Source Pre-construction Permit Application Review Process

- Air Pollution Control Regulation No. 9 states that the following conditions must be met if a minor source permit application is to be approved:
  - (1) A stationary source shall apply BACT for each pollutant it would have the potential to emit. A modification shall apply BACT for each pollutant for which there would be a net emissions increase at the stationary source. In no event shall BACT be less stringent than any applicable emission rate contained in the Department's Air Pollution Control Regulations.
  - (2) Emissions from the stationary source shall not cause or contribute to air pollution in violation of any applicable state or national ambient air quality standard.
  - (3) Emissions from the stationary source will not cause an increase in the ground level ambient concentration at or beyond the property line in excess of that allowed by Air Pollution Control Regulation No. 22 and any Calculated Acceptable Ambient Levels.
  - (4) A new stationary source or a modification of an existing stationary source must conduct any studies required by the Guidelines for Assessing Health Risks from Proposed Air Pollution Sources and meet the criteria therein.
  - (5) The stationary source will be in compliance with all applicable state or federal air pollution control rules or regulations at the time the stationary source or modification commences operation.

- In order to evaluate a minor source permit application to determine if these conditions are met, the following are the activities that take place in the permit review process:

(1) Application/File Review

Initially, the engineer reviews the application to get a complete understanding of what the applicant is making application for. If the applicant is an existing source in Rhode Island, the engineer also reviews the Office of Air Resources files for that company.

This review provides some background information on the facility that will be needed when the engineer begins to evaluate applicable regulations. This review also includes an evaluation of the facility's compliance history (see Condition 5). This review also includes a review of the company's emission inventory files to determine if the existing facility is a major source.

(2) Quantification of Emissions

The reviewer needs to determine the "potential-to-emit" of the proposed project. The primary importance of this work is to determine whether the new or modified source is major. Additionally this information may be needed if air quality impact analyses are to be conducted (see Conditions 3 & 4).

(3) Determination/Confirmation that the Proposed Project is Minor

This determination is made in most cases based on the calculations done in (2) above. For an existing facility, the reviewer must determine actual emissions for the existing facility, generally over the most recent two-year period. This is used to determine the net increase in emissions that is occurring. If the applicant is removing equipment or reducing emissions elsewhere at the same time they are proposing this project, those emissions need to be quantified and "netting" calculations need to be performed. Additionally, if the project is a source of VOC or NO_x and an existing facility that is major, a review of all emission increases and decreases in the last five years must be undertaken to determine if emission increases/decreases over that period, in the aggregate, exceed major thresholds.

(4) Determination of Applicable Regulations

The reviewer must determine what state and federal air pollution control regulations, the proposed project is subject to. A checklist is used that includes all of the current state and federal air pollution control regulations. For each regulation that is determined to be applicable the reviewer, must explain how/why the proposed project is capable of complying with all aspects of that regulation. (see Condition 5).

(5) Best Available Control Technology Evaluation

The objective of this evaluation is to determine that Condition 1 is being satisfied, i.e. that the best available control technology is being applied to the project. The reviewer uses a number of information sources to conduct this evaluation, including:

- Published BACT determinations or guidelines on the websites of various state and local air pollution control agencies.
- EPA's RACT/BACT/LAER Clearinghouse on the web that contains information on BACT determinations made for mostly major projects.
- Information obtained from other permitting authorities including those in the other NESCAUM states (CT, ME, MA, VT, NH, NJ and NY).

(6) Air Quality Impact Analysis

The main purpose of this analysis is to demonstrate that Conditions 2, 3(if necessary) and 4 are being met. If the emissions from the proposed project include listed air toxics (from DEM's Air Pollution Control Regulation No. 22), this analysis is always done. If the emissions from the proposed project include only criteria pollutants (NO_x, SO_x, CO or PM), this analysis may be conducted. The decision on whether to conduct this analysis is made on a case-by-case basis. For instance, if the project involves a like kind replacement (installing a new boiler to replace an existing boiler of a similar size), the reviewer would not do an impact analysis.

Air quality models are used to conduct this analysis. Two levels of modeling exist: screening and refined dispersion modeling. Screening models are simpler to run and produce conservative estimates of air quality impacts. The reviewer conducts only screening level modeling. If the results from the screening level modeling predict air quality impacts in excess of that allowed, the applicant is given the choice of reducing emissions further or conducting refined air quality modeling.

When, in the judgement of the permitting staff, it is likely that an air quality impact analysis would not reveal any adverse impact, the reviewer does not do air quality modeling for each application because of processing time considerations.

(7) Prepare a Permit Review document

The reviewer will then prepare a permit review document. This document will discuss the findings for each of the evaluations conducted and recommend either the approval or denial of the application.

(8) Prepare a Draft Permit

If the application can be approved, a draft permit is prepared. The draft permits contain terms and conditions in the following areas: Emission Limitations; Operating, Monitoring and Testing Requirements, Record keeping and Reporting Requirements and Other Requirements.

The applicant is not required to conduct each of these evaluations in their application. The applicant is only required to complete the form, any attachments and provide a description of the project

Appendix D –EPA Website BACT Fields

	RACT/BACT/LAER Clearinghouse Database Fields	Recommended RIDEM BACT Input Fields
1.	RBLCID	
2.	City	x
3.	State	x
4.	Facility Name	x
5.	EPA Region	x
6.	Permit Number	x
7.	Agency Name	x
8.	Contact Name	x
9.	Phone	x
10.	Airsid	
11.	SIC	x
12.	Permit Date	x
13.	Permitea	
14.	Last Update	
15.	Process	x
16.	Pollutant	x
17.	Process Type	x
18.	Thruput	x
19.	Thruput Units	x
20.	Compverify	
21.	SCC	x
22.	Chemical Abstract Service #	
23.	Primary Units	x
24.	Primary Emissions Amount	x
25.	Controlcod	
26.	Control Description	x
27.	Percent Efficiency	x
28.	Cost Effectiveness $/Ton	x
29.	Dollar Year (Eg 2001)	x
30.	Basis	

State of Rhode Island
Department of Environmental Management

Rhode Island Guideline

for

Air Quality Modeling for

Air Toxics Sources

Draft Revised Edition

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Glossary of Acronyms and Symbols

AAL	Acceptable Ambient Level
ATOP	Air Toxics Operating Permit
BCRP	Building Cavity Region Program
CAALs	Calculated Acceptable Ambient Levels
CEM	Continuous Emission Monitoring
EPA	Environmental Protection Agency
g/sec	Grams per second
GEP	Good Engineering Practice
hr/yr	Hours per year
lb/hr	Pounds per hour
LAER	Lowest Achievable Emission Rate
$\mu g/m^3$	Micrograms per cubic meter
OAR	Office of Air Resources
σ_{yo}	Initial horizontal sigma or dimension
σ_{zo}	Initial vertical sigma or dimension
SCRAM	EPA's Support Center for Regulatory Air Models
USGS	United States Geological Survey
UTM	Universal Transverse Projection

Definitions

Air contaminant: A substance emitted to the atmosphere as dust, fume, gas, mist, smoke, vapor, or soot which may adversely affect human health or welfare, animal life, vegetation, or property.

Ambient air: The portion of the atmosphere to which the general public has access.

Background: Air contaminant concentrations present in the ambient air that are not attributed to the source or site being evaluated.

Exceedance: In excess of a pre-established comparison level.

Emission point: Point of air contaminant release into the air.

Facility: All pollutant-emitting activities which belong to the same industrial grouping, are located on one or more contiguous or adjacent properties, and are under the control of the same person (or persons under common control). Pollutant-emitting activities shall be considered as part of the same industrial grouping if they belong to the same "major group" (i.e. which have the same two-digit code) as described in the Standard Industrial Classification Manual.

Model: A quantitative mathematical representation or simulation that uses building, stack, emissions and meteorological information to predict the impact of air contaminants emitted by one or more sources on ambient air.

Property: All land under common control or ownership coupled with all improvements on such land and all fixed or movable objects on such land, or any vessel on the waters of this state.

Receptor: A location where the public could be exposed to an air contaminant in the ambient air.

Refined model: A model that provides a detailed treatment of physical and chemical atmospheric processes and requires detailed and precise input data. The outputs are more accurate than those obtained form conservative screening techniques.

Screening technique: A relatively simple modeling technique to determine whether a given source is likely to pose a threat to air quality. Concentration estimates from screening techniques are conservative.

Site: The area that encompasses all emission sources of air contaminants.

Source: A point of origin of air contaminants, whether privately or publicly owned or operated. When used in the context of modeling, the term source refers to the release point of emissions.

Stationary source: An emission point that is fixed and not mobile. For example, exhaust from a stack or baghouse is from a fixed point, and exhaust from a car is from a mobile source because the exhaust moves as the car does.

1.0 INTRODUCTION

The purpose of this guideline is to standardize the procedures used for air quality modeling to determine compliance with the air toxics limitations in Rhode Island Air Pollution Control Regulations No. 9 and No. 22. This guideline should not be used to meet Clean Air Act, RCRA, or any other federal requirements that invoke the EPA's Guideline on Air Quality Modeling[1].

To obtain an air toxics operating permit (ATOP), Subsection 22.5.3 of Regulation No. 22 requires a demonstration that emissions from a facility will not cause an increase in the ground- level concentration of an air toxic in exceedance of the Acceptable Ambient Levels (AALs) listed in that regulation and in Appendix A of this document. New sources must make a similar demonstration for both listed and non-listed air toxics to obtain a permit to construct, install or modify. The Rhode Island Department of Environmental Management, Office of Air Resources (OAR) develops Calculated Acceptable Ambient Levels (CAALs) for evaluating impacts of non-listed air toxics from new sources, in conjunction with permit applications.

Demonstrations of compliance with AALs and CAALs require the use of air quality modeling techniques. Information about emissions, stacks, building dimensions and meteorology is input into the model, which then mathematically simulates the dispersion of the pollutant and estimates the concentration of that pollutant which would occur as a result of those emissions at various distances downwind of the source. Since the AALs and CAALs refer to the increase in concentration of a pollutant associated with emissions from a facility, background levels of the pollutant are generally not considered.

This guideline recommends specific modeling procedures, but cannot anticipate every potential situation. OAR staff generally performs modeling in conjunction with the issuance of ATOPs. In cases where this guidance is used by facilities or their contractors, the applicant should submit a modeling protocol to the Office of Air Resources before undertaking the modeling analysis. This is particularly important if refined modeling is necessary or if the applicant plans to deviate from using the models or procedures specified in this document. General guidance on dispersion modeling is also found in EPA's Guideline on Air Quality Models[1] and the models discussed in this document, along with accompanying User's guides, are available on the EPA's Support Center for Regulatory Air Models (SCRAM) website, http://www.epa.gov/scram001.

This guideline presents an approach to air modeling which begins with the collection of basic source information. The modeler then calculates Good Engineering Practice (GEP) stack height, performs a building cavity analysis, and uses a screening model to predict downwind impacts. Screening models are relatively easy to run and are designed to produce conservative (i.e. biased high) downwind concentration estimates by using simplifying assumptions and the use of worst case meteorology. In many cases, a screening analysis provides an adequate demonstration of compliance with AALs. If such a demonstration cannot be made using simple screening procedures, then a refined analysis using actual hourly meteorological data is necessary.

2.0 REQUIREMENTS FOR AIR QUALITY ANALYSIS

This section gives an overview of the components of a modeling study. Details regarding modeling techniques are discussed in the sections that follow.

2.1 Facility Data

Obtaining accurate and complete facility data is essential for accurate modeling results. The following information is required for most air toxics modeling demonstrations:

- A site plan, to scale and with a North arrow, showing the property boundaries, all building dimensions, grade elevations, stack locations, stack base elevations and stack heights suitable for a Good Engineering Practice (GEP) analysis.

- A description of the equipment or process which is emitting air toxics.

- For each emission point:

  - Is the release through a vertical stack, a horizontal stack or vent, or is it a fugitive release through windows and/or doors?

  - If the release is through a stack, the inside diameter at stack top; stack height; and whether stack has a raincap. If the stack is rectangular, an effective stack diameter (the diameter of a circle having the same area as the rectangular inside opening) must be calculated using the following equation:

    $$\text{Effective diameter (m)} = (4 \text{ X opening width (m) X opening length (m)} / \pi)^{1/2}$$

  - If the release is not through a stack, the location and size of the opening.

  - Which air toxics are emitted.

  - For both maximum and typical operating load conditions, the pollutant emission rate (lb/hr), stack gas exit temperature and stack gas exit velocity.

- The operating schedule for the process(es) that emit air toxics in hours/day, days/week and weeks/year.

- A topographical map out to 5 km from the source.

- A determination of whether the source is in an "urban" or "rural" area for modeling purposes according to the specifications in subsection 8.2.8 or the EPA's Guideline on Air Quality Models[1], which is available on the SCRAM website. The Guideline recommends that this determination be based on either land use or population density within a 3-kilometer radius of the source. However, since the maximum impacts usually occur relatively close to air toxics sources, a review of the area immediately surrounding a facility is most important.

All emission points under review should be modeled at both maximum and typical operating load conditions. If compliance with regulatory limits can be demonstrated at typical operating load conditions but not at maximum load conditions, load restrictions may be stipulated in permits.

2.2 GEP Analysis

For each stack or emission point, a Good Engineering Practice (GEP) stack height determination must be performed in accordance with EPA Guideline for Determination of Good Engineering Practice Stack Height (Revised)[2] , which is available on the SCRAM website, and the definitions in EPA's "Stack Height Regulations, Final Rule."[3] For sources that are near more than one building or buildings with multiple roof heights, the building with the greatest GEP height is said to be the "controlling building" or "controlling tier" and is the one used in screening modeling. For refined modeling, a more detailed GEP analysis is required in which the controlling building (its height and width perpendicular to the wind) are identified for 36 different wind directions, starting with North and spaced 10^o azimuth around the compass. When refined modeling is anticipated and more than one building is involved, the U.S. EPA Building Profile Input Program (BPIP)[4], which is available on the SCRAM website, should be used.

2.3 Cavity Analysis

If all emission points are at or above the GEP stack height, a cavity analysis is not performed. Otherwise, it must be assumed that some portion of the emissions will be trapped in a downwash recirculation cavity behind nearby buildings. As concentrations in these cavities can be relatively high, due to the limited air volume into which pollutants are mixed, the objectives of a cavity analysis are: (1) to determine if the cavity extends beyond a facility's property line for any wind direction, and if so then (2) to determine if the maximum concentrations in the cavity exceed any AAL for 1-hour, 24-hour or annual time periods.

Guidance on cavity modeling techniques is given in Section 3. Compliance with the AALs in the cavity analysis does not eliminate the need to do dispersion modeling for areas outside of the downwash cavity.

2.4 Screening Modeling - Wake Region

Screening modeling is a relatively simple procedure used to conservatively calculate concentrations outside cavity regions (in the wake region) at receptors on and beyond a facility's
property line. If predicted concentrations are less than the AALs or CAALs for those pollutants, no further analysis is required. If predicted impacts exceed an AAL by a factor of less than 10, refined modeling techniques, which generally reduce estimated impacts, may be used. If the impacts predicted by screening modeling exceed the AAL or CAAL by a factor of 10 or more, it is very unlikely that refined modeling would demonstrate compliance, and the facility will be asked to submit a plan for reducing emissions or improving dispersion characteristics before additional modeling is undertaken. Screening modeling must consider receptors in both simple and complex terrain, the latter being elevations above stack top. Guidance on screening modeling techniques is given in Section 4 of this document.

2.5 Refined Modeling - Wake Region

A refined model provides a detailed analysis of the process of transport and dispersion of emissions from one or multiple sources and predicts impacts from those emissions at a large numbers of receptor points downwind. Refined modeling requires either one year of hourly meteorological data collected on-site or five full years of hourly data from a representative National Weather Service site. If there is a violation of an AAL, the source will need to submit a plan for reducing ambient impacts. This plan might include reducing emissions through process modifications or changing stack parameters. Refined modeling must consider receptors in both simple and complex terrain. Guidance on refined modeling techniques is given in Section 5.

2.6 Modeling to Determine Maximum Allowable Emissions

In addition to determining compliance with AALs and CAALs, modeling can be used to calculate the maximum allowable emissions rate of a pollutant allowed for a facility.

If the pollutant is emitted from only one source at the facility, maximum allowable emissions rate is calculated according to the following formulas:

Max Allowable Emiss, (lb/hr) = [1-hr AAL ($\mu g/m^3$) / Max Modeled 1- hr Impact ($\mu g/m^3$)] * Modeled Emiss. Rate (g/sec) * 7.94 lb/hr / g/sec

Max Allowable Emiss. (lb/dy) = [24-hr AAL ($\mu g/m^3$) / Max Modeled 24- hr Impact ($\mu g/m^3$)] * Modeled Emiss. Rate (g/sec) * 7.94 lb/hr / g/sec * 24 hr/dy

Max Allowable Emiss. (lb/yr) = [annual AAL ($\mu g/m^3$) / Max Modeled Annual Impact ($\mu g/m^3$)] * Modeled Emiss. Rate (g/sec) * 7.94 lb/hr / g/sec * 8760 hr/yr

If more than one source at the facility emits the pollutant, the dispersion characteristics of the sources may not be equivalent, and this fact must be considered when calculating maximum allowable emissions rates.

To calculate the most accurate maximum allowable emissions rate, refined modeling, rather than screening modeling should be used for the non-cavity region. However, refined modeling is not necessary when the maximum ground-level concentration in the cavity region is greater than the value predicted in the non-cavity region using screening modeling or if the facility can agree to limit its emissions to less than the maximum allowable emission rate, calculated using the screening modeling results.

2.7 Land Use Considerations

Regulation No. 22 allows OAR to exempt impacts in areas that are not accessible to the public from consideration when determining compliance with AALs. In addition, OAR may, at its discretion, adjust annual or 24-hour AALs used to evaluate the impacts in areas where, due to land-use considerations, public exposure potential is limited. For example, exposures in industrially zoned areas are generally limited to 40 hours per week, as compared to the potential for continual exposures in residential areas. A facility that wishes to exclude an area from a modeling analysis or to apply a less stringent AAL to an area where exposure opportunities are limited should supply documentation to OAR that demonstrates land-use restrictions in those areas.

3.0 BUILDING CAVITY MODELING TECHNIQUES

Short stacks and vents on the sides and roofs of buildings can cause relatively high concentrations in the recirculation cavity behind a building. The length of this cavity is measured from the lee side of the building. As a first cut, the Schulman/Scire option in EPA's SCREEN3 model should be used to evaluate pollutant impacts in the cavity region. The SCREEN3 model is available for download on the SCRAM website.

The first task is to identify which, if any, of the building cavities extend beyond a facility's property line and which, if any, stacks contribute to pollutant concentrations in these cavities. Emissions from a less than GEP height stack should be assumed to be caught in a building's cavity region if the stack is attached to the building under evaluation or is less than 2 L_b upwind of the building (where L_b is the smaller of the building height and width), 1/2 L_b from the sides of the building, or within L_R (the recirculation cavity length) downwind. L_R is calculated by the Schulman/Scire option of SCREEN3. Emissions from horizontal stacks, vents that are essentially flush with the roof or sides of a building, doors and windows and other fugitive sources should always be assumed to be captured in the building cavity.

Estimating the cavity lengths for four wind directions, each normal to one of the building faces, is generally sufficient for determining if any cavity regions extend off site. However, off-axis cavity regions may also have to be considered, depending on the shape of the property. Direction-specific building dimensions must be used to determine the extent of off-axis cavity regions. The Office of Air Resources has developed a computer program called BCRP (Building Cavity Region Program) that performs this task. This program displays building cavity regions and their relationship to facility property boundaries for thirty-six wind directions and can be used to determine if a cavity analysis is necessary. The BCRP program and user's guide can be obtained free of charge from the Office of Air Resources by calling (401) 222-2808 or by sending a written request.

Building cavity models assume a simple block-like building. For buildings that are not square, a four-sided foot print of the building should be used for the cavity analysis. Emissions from non-vertical stacks, vents or other fugitive sources can be modeled with the SCREEN3 model using a point source with an exit temperature of 294^{o}K, an exit velocity of 0.001 m/s and a diameter of 1.0 m. These values ensure no plume rise is added to the source height. In the SCREEN3 Schulman/Scire cavity analysis, the minimum height at which a source can be set is the building height. Therefore, releases located below the roof line should be modeled at a height of 0.1 meters above the roof height.

When there are multiple buildings or building tiers or multiple sources, the modeler must identify all sources that add pollutant mass to the cavity region of each building or tier. In the case of a multi-tiered building, one approach is to use a simple block structure that simulates the general shape of the building complex. Another approach is to model each building tier separately and determine which tier causes the greatest impact.

In general, the impacts from individual building cavities should be modeled separately and the greatest predicted impact used to determine compliance. If cavity impacts for different sources at a facility overlap, then the concentrations for the same air toxic should be summed to determine impacts in the overlapping regions. For the case of multiple stacks in the same building cavity emitting the same air toxic, each stack should be modeled separately and the results summed to obtain a total cavity concentration.

Predicted concentrations in cavity regions that extend beyond the facility's property line should be compared to the Regulation No. 22 Acceptable Ambient Levels (AALs) and, for preconstruction applications, to any CAALs developed pursuant to Regulation No. 9 requirements. The modeled concentrations are one-hour averages, and should be compared to the AALs for that averaging time. To simplify the analysis for situations which involve more than one stack or building, the maximum one-hour concentration of a pollutant in all applicable cavity regions can be summed and the sum compared to the one-hour AAL.

Impacts in cavity regions that extend off-site should also be compared to 24-hour and annual average AALs. Since SCREEN3 predicts only one-hour impacts, the following method should be used for this comparison:

- Compare the one-hour cavity impact determined as discussed above to the appropriate 24-hour and/or annual AAL.

- If the one-hour impact does not exceed the 24-hour AAL and the one-hour impact multiplied by 0.30 does not exceed the annual AAL, then the source has demonstrated compliance.

If a facility cannot demonstrate compliance with the AALs in the cavity regions using SCREEN3, refined cavity modeling can be conducted using the EPA Industrial Source Complex-Plume Rise Model Enhancements (ISC-PRIME) model. This model is discussed further in Section 5 of this document. This option may also be chosen initially instead of SCREEN3, particularly if refined modeling is necessary for the wake region or if multiple sources and/or buildings are involved in the analysis.

4.0 SCREENING MODELING – WAKE REGION

The EPA SCREEN3 model should be used for screening level modeling of point, area and volume sources to calculate non-cavity concentrations at receptors in simple terrain (elevations below stack top). As discussed in subsection 4.7 below, SCREEN3 should be run with the model's VALLEY complex terrain screening option when receptors in complex terrain (elevations at or above stack top) are present.

4.1 Time Scaling Factors

SCREEN3 predicts maximum one-hour concentrations at defined receptors. Concentrations for longer averaging times can be obtained by multiplying the one-hour concentration generated by SCREEN3 by the factors in the following table.[5]

Averaging Time Desired	Multiply One-Hour Concentration by:
3 hours	0.9
8 hours	0.7
24 hours	0.4
Annual	0.08

Complex terrain concentrations output by the VALLEY option of SCREEN3 are 24-hour averages. These can converted to 1-or 3-hour averaging periods by multiplying by 4.0. If an 8-hour concentration in complex terrain is needed, the 24-hour concentration should be multiplied by 3.0 (plume impaction for 6 hours followed by 2 hours of no impaction).

4.2 Receptor Locations

In SCREEN3, receptors are assumed to lie downwind along the centerline of the plume from a single source. Thus only one wind direction is modeled. The receptors should be spaced no farther apart than 100 meters in the first 2000 meters downwind and the first receptor point should be placed at the closest distance the source lies to the property boundary. Once a maximum impact is found, additional receptors at a 10 meter spacing around this point should be analyzed. For high stacks, receptors beyond 2 km and out to 10 km may be appropriate for the initial modeling runs.

The terrain height for each receptor is obtained from reading U.S. Geological Survey topographical maps. A set of concentric circles should be drawn on the maps corresponding to the receptor distances from the source. The single terrain height for each receptor should be selected as the highest terrain that occurs anywhere in the annulus defined by the two radii halfway to the next ring inside and outside of the receptor's ring distance. By this method, every point on the map is examined in assigning maximum terrain heights to the receptors.

The user should take special note that the SCREEN3 model does not ask for stack base elevation (meters above Mean Sea Level); the model assumes the stack is at a base elevation of 0 meters. Thus, one can not directly enter terrain elevations taken from U. S. Geological Survey maps into SCREEN3. The user must first subtract the stack base elevation from the terrain elevation to get the relative rise of terrain above stack base. This is what the model expects. All elevations are in meters, not feet.

Simple terrain is land that is above stack base elevation but not higher than stack top. In SCREEN3, the user is given the choice of modeling simple terrain or flat terrain. Flat terrain should be selected when none of the receptor terrain heights exceed the stack base elevation. For example, a stack sitting on top of the highest hill would be modeled as flat terrain. For simple terrain, the SCREEN3 model prompts for a terrain height above the stack base elevation and uses this single number for making calculations at the entire group of receptors, whether the receptors are chosen with the automated array option or specified as discrete receptors. By requesting multiple sets of receptors, the modeler can enter more than one terrain height into the calculations.

The SCREEN3 model also asks for the receptor height above ground. This is not the height of the terrain, but rather is the height of the receptor above the ground-level elevation. Generally, the receptor height above ground is set equal to zero, meaning all receptors are at ground level. If a non-zero value is used, then all receptors will be assumed to be floating at this height above their respective ground-level elevations. An example of when this option might be used is when pollutant concentrations need to be known at open windows or at fresh air intakes on top of buildings.

4.3 Point Sources

Although the SCREEN3 model is only designed for single sources, the impacts from two or more point sources can be conservatively estimated by modeling each singly and then adding the maximum concentrations together, regardless of the associated downwind distances. This is a useful approach when individual impacts are small and compliance with regulatory standards can be easily demonstrated without using a refined model. The emissions from multiple stacks which are located within 100 meters of each other and which have volumetric flow rates that differ by no more than 20% can also be merged using the following procedure[5]:

Step 1 Compute the dimensionless parameters M for each stack to be merged where:

M = $(H_s*Q*T_s)/E$

Where,

M = dimensionless parameter
H_s = stack height above ground (m)
Q = volumetric Flow Rate $(\pi D^2/4)V$, (m^3)
D = effective stack exit inside diameter, (m)
V = stack gas exit velocity, (m/s)
T_s = stack gas exit temperature, (^oK)
E = pollutant emission rate, (g/s)

Step 2. Determine which of the stacks has the lowest value of M. This is the representative stack.

Step 3. Sum the emissions (E) from the stacks that are being merged. This summed emission rate along with the stack parameters for the representative stack should be used in modeling the merged stacks.

For the case of horizontal stacks or vertical stacks with raincaps, the exit velocity should be set to 0.001 m/s to eliminate plume rise from momentum, while the flow rate is held constant. In order to maintain a constant flow rate for vertical rain-capped stacks, the modeled stack diameter must be different from the actual stack diameter. The modeled stack diameter for vertical rain-capped stacks should be calculated using the following equation:

$$d_m = d_a (V_a/V_m)^{1/2}$$

where:
d_m = modeled stack diameter;
d_a = actual stack diameter;
V_m = modeled stack exit velocity, i.e., 0.001 m/s; and
V_a = actual stack exit velocity.

If building downwash is to be considered, no stack tip downwash correction is made by the model. When building downwash is not to be considered, however, the model does make a stack tip downwash correction and the modeled stack diameter should be set equal to the actual stack diameter in order to avoid unrealistically small modeled stack heights.[6] For horizontal stacks, the modeled stack diameter should be set equal to 1.0 meters.

Flares, such as those used to burn landfill gas, are modeled as elevated point sources. The technique to calculate buoyancy flux for flares generally follows the technique described in the SCREEN3 Model User's Guide[7], which is available on the SCRAM website.

The following parameters should be used when modeling flares:

- Effective stack exit velocity = 20 m/s
- Effective stack exit temperature = 1273 ^{o}K
- Actual height of the flare tip, and
- Effective stack exit diameter, calculated as:
  $D = [(10^{-6}\, q_n)]^{1/2}$ and $q_n = q[1-0.048\,(MW)^{1/2}]$

  Where:
  D = effective stack exit diameter (meters)
  q = gross heat release in cal/sec;
  q_n = net heat release in cal/sec; and

MW = weighted (by volume) average molecular weight of the compound being flared.

4.4 Volume Sources

The SCREEN3 model should also be used for the screening analysis of the non-cavity impacts of emissions from vents, along the faces and roofs of buildings, through doors and windows and in similar situations. These releases are best represented by a volume source having the dimensions of the building from which the emissions originate. Very short vertical stacks on buildings, those for which the stack height to building height ratio is below 1.2, can also be modeled as volume sources for receptors beyond the cavity region.

Volume sources must have a square base, but need not be a cube. For a square, or nearly square, source the actual building dimensions (height and width) should be used for the screening analysis. For non-square sources, the width of the source should be set equal to the minimum building length.

A volume source is defined by its release height (HS) and initial lateral and vertical dimensions, σ_{yo} and σ_{zo} respectively. The release height is the center of the volume source and so it should be set equal to one-half the average building height. The initial lateral dimension for a volume source should be set equal to its width divided by 4.3. The initial vertical dimension for a volume source should be set equal to the average building height divided by 2.15.

The location and elevation of receptors should be determined for volume sources in the same manner as for point sources. The downwind distance used in the model is measured from the center of volume source, not its edge. The modeler should be careful in measuring the distance to the first receptor.

4.5 Area Sources

The SCREEN3 model should be used for a screening analysis of the impact of emissions from area sources such as landfills, surface impoundments, wastewater lagoons, tank farms, and other chemical storage areas. The release height should be set to zero, except in the case of tank farms and storage areas, where the release height should be set to the average height of the chemical release.

The downwind distance used in the model is measured from the center of the area source, not its edge. The modeler should be careful to measure the correct distance from the center of the area source to the nearest property line in setting the first receptor distance. Generally the receptor distance should not be less than the length of one side of the area source.

4.6 Evaluating Facilities with Combinations of Point, Area, and Volume Sources

The SCREEN3 model should be used for the screening analysis of the impact of emissions from facilities having combinations of point, area, and volume sources. All sources should be collocated and the impacts at each receptor due to each source should be summed. The modeler should remember that receptor distances are measured from the center of volume and area sources, not from the edge. If sources would not be realistically collocated, refined modeling may be more appropriate.

4.7 Complex Terrain Modeling

When conducting screening modeling analyses for point sources, complex terrain modeling techniques should be used for receptors with elevations higher than the top of a stack being modeled. To model this situation, the complex terrain option in the SCREEN3 program (VALLEY) should be selected. As discussed above, VALLEY generates a 24-hour concentration, which can be scaled to a 1-hour concentration by multiplying by a time scaling factor of 4.0.

VALLEY allows the plume centerline to come as close as 10 meters to the ground and calculates the Distance to Final Rise and the Final Stable Plume Height. Presuming that complex terrain exists closer to the stack than the Distance to Final Rise, receptors to be modeled should be located at distances less than the Distance to Final Rise and at terrain elevations between the stack height and the Final Stable Plume Height minus ten meters. These receptors should be analyzed in one meter increments of elevation. The locations of these one meter increments should be interpolated from topographical maps where necessary.

Generally the highest VALLEY concentration will be predicted where the terrain elevation is at least as high as the plume height minus 10 meters. Both terrain and plume height vary with downwind distance, although the plume eventually levels off. When searching for the maximum impact in complex terrain, the modeler needs to be aware of not only the change in terrain height with distance, but also the change in plume height.

If the terrain is above stack height but below the height of the plume centerline, then SCREEN3 makes two calculations- (1) a 24-hour VALLEY estimate as described above which assumes a 1 to 24-hour time scaling factor of 0.25, and (2) a 24-hour simple terrain model estimate across a full range of meteorological conditions which assumes a 1 to 24- hour time scaling factor of 0.4. The terrain is chopped off at stack height in the simple terrain calculation. The SCREEN3 output prints out columns of both estimates and the higher of the two estimates. The higher of the two estimates should be used for comparison with AALs or CAALs. If the terrain is at or above plume height, only the VALLEY calculation is shown. Finally, it should be noted that neither the complex terrain calculations nor the simple terrain calculations consider building downwash effects when the VALLEY option is selected.

5.0 REFINED MODELS

The EPA Industrial Source Complex-Plume Rise Model Enhancements model (ISC-PRIME) should be used for refined modeling of air toxics releases. ISC-PRIME can be used to predict the impact of emissions from any combination of point, area and volume sources for one-hour, 24-hour and annual averaging periods at user-defined receptors. Either one year of on-site meteorological data or the most recent five years of meteorological data from a representative National Weather Service site should be used in the model. Representative meteorological data can be obtained from the Office of Air Resources free of charge by calling 222-2808 or sending a written request. Facilities who plan to collect on-site meteorological data for use in modeling should meet with OAR prior to beginning data collection to discuss siting criteria, parameter selection, instrumentation, data processing, quality control measures and other factors relevant to collecting data that will be appropriate for modeling purposes.

Appendix B contains a checklist for refined modeling. This checklist should be used for both new modeling and the review of existing modeling.

Refined modeling should not be attempted by any person who is not well trained in dispersion modeling techniques and is familiar with ISC-PRIME and its extensive data requirements. The selection of model options for refined modeling should follow specific guidance given by EPA. Both the model and a user's manual available on the SCRAM website.

5.1 <u>Receptor Locations</u>

Receptor networks are of two common types - polar and Cartesian. In a polar network, concentric rings and radials spaced every 10^o extend out from a center point (the emissions source). Receptors are located where the rings and radials intersect; a minimum of 360 receptors (10 rings) should be used. In a Cartesian network, a rectangular grid is used and should contain a minimum of 400 points (20 X 20). The polar grid is the easiest to use and is recommended. Terrain heights and receptor spacing should be selected as discussed in Section 4.2 of this document. Refined modeling should always include at least two runs; the first to identify the general area of the maximum concentration, and the second with a finer scale grid (10m spacing) to pinpoint the highest concentration. For most air toxics sources, maximum impacts are
predicted very close to the source and, therefore, receptors placed along the property line may experience the highest concentrations.

Since an excessive number of receptors will lead to an unreasonably long run time on the computer, it is best to select receptor distances for refined modeling by first running the SCREEN3 model. Receptors should be spaced farther apart as distance increases, since the greatest concentration gradients usually occur close to a source. For example, a possible set of initial ring distances is the geometric progression: 0.1, 0.2, 0.5, 1.0, 2.0, 5.0, 10., 20., 50. km. Run SCREEN3 with meteorology option (2) and a single stability class six separate times, for classes A through F. For each stability class, identify the distance where the 1-hour maximum concentration occurs and the range of distances over which impacts close to the maxima (i.e., +/-10 percent) occur. Long-term (annual) impacts will be determined primarily by the meteorological conditions that occur most often; in the case of New England, this is stability class D.

In summary, select ring distances as follows:

- Distances where 1-hour maxima occur for each stability class.

- Distances where concentrations close to the maxima occur for the most frequently occurring stability class (D).

- Distances where the highest terrain features occur.
- The closest fence line or property line inside of which public access is restricted.

5.2 Complex Terrain Modeling

For receptors located above stack top, a separate analysis of point source impacts using a complex terrain model is required. Since the data requirements for refined complex terrain modeling are quite extensive, the Office of Air Resources prefers that modelers use either the VALLEY option of SCREEN3, CTSCREEN or the COMPLEXI algorithm in ISC-PRIME for this purpose. COMPLEXI is a multiple point source screening technique with terrain adjustment that incorporates the plume impaction algorithm. These models and user's guides are available on EPA's SCRAM website.

The simplest approach is to use ISC-PRIME with screening meteorological data to predict impacts at all receptors in simple, intermediate, and complex terrain. The screen meteorological data, which is equivalent to that used in SCREEN3, can be obtained from the Office of Air Resources. The wind profile exponents for stable conditions in ISC-PRIME should be disabled so that the lowest wind speed class is used for these stability classes.

COMPEXI predicts maximum hourly impacts. The following scaling factors should be used to convert those impacts to longer averaging times:

Averaging Time Desired	Multiply One-Hour Concentration by:
3 hours	0.9
8 hours	0.6
24 hours	0.35
Annual	0.04

A more refined approach is to model simple terrain impacts using actual representative meteorological data and intermediate and complex terrain using the screen meteorological data. The maximum impacts from the two runs should be compared in order to determine the greatest impacts for all receptors.

Hourly meteorological data are not required for the VALLEY or CTSCREEN models. CTSCREEN may be used to estimate concentrations under all stability conditions at all receptors located above stack height. However, the VALLEY model should not be used for any intermediate terrain receptors.

5.3 Point Sources

Vertical stacks that are greater than 1.2 times the height of the building to which they are attached should be treated as point sources. The results of the GEP analysis are needed to specify the actual projected building width and height for the controlling tier corresponding to thirty-six different wind directions.

Refined modeling uses a slightly different approach to model horizontal stacks and vertical stacks with rain caps than in screening modeling. As is the case in screening modeling, the exit velocity of such a stack is set to 0.001 m/s while the flow rate is kept constant by adjusting the modeled diameter (see Section 4.3). When modeling this scenario, the stack tip downwash option in ISC-PRIME should be turned off and the stack height of vertical stacks only should be reduced by three times the actual stack diameter in order to account for stack tip downwash (with the minimum value equal to ground level). This approach may not be valid for large diameter stacks, i.e., several meters.[3] For horizontal stacks, the modeled diameter should be set equal to 1.0 meter. However, stack tip downwash is not appropriate when modeling horizontal stacks and no correction should be made to the stack height.

Refined modeling for open flares should use the parameters presented in Section 4.3.

5.4 Volume Sources

In ISC-PRIME modeling, it is possible to use multiple volume sources to more accurately represent the geometry of a building complex. The general approach is to sub-divide the building's footprint into a number of smaller elements, each of which is essentially square. For square or nearly square footprints, a single volume source should be used.

Volume sources must have a square base, and for simplicity the multiple squares used to approximate a complex building's footprint should all have the same dimension. For rectangular buildings, the side of the square should be roughly equal to the minimum footprint dimension. A good rule of thumb is that the total area of the volume sources should be less than or equal to the area of the building's actual footprint. This will ensure that the initial dilution volume is not over-estimated (and concentrations under-estimated). The selection of the number and size of volume sources is left to the good judgement of the modeler following this guidance. The volume sources should be placed to best represent the features of the actual building. Total building source emissions should be divided equally among the number of volume sources. Calculation of the initial lateral and vertical dimensions, and the source release height, should follow the guidance in Section 4.4.

5.5 Area Sources

The refined modeling of area sources is similar to that of volume sources, except that the release height is either at or near ground level. Therefore the modeling guidance described in Section 5.4 should be followed for area sources also.

5.6 Open Pit Sources

Particulate emissions from open pits such as quarrying operations can be modeled with ISC-PRIME using open pit source characterization to simulate emissions that initially disperse in three dimensions with little or no plume rise. Parameters needed are the open pit emission rate, the average release height, the lengths of the sides of the open pit, the volume of the open pit, and the orientation angles in degrees from 360 degrees (north). Some factors to consider are:

- As with an area source, an emission rate per unit area is used; that is, the total emissions in grams per second divided by the total area in square meters.
- The release height above the base of the open pit cannot exceed the pit's effective depth, which is calculated by the model based on the pit's length, width, and volume.
- The length-to-width aspect ratio for open pit sources should be less than 10 to 1.
- Receptors cannot be placed with the boundary of the pit.

6.0 UNCONVENTIONAL AIR TOXICS RELEASES

For unconventional air toxics releases such as non-buoyant, heavy gas, instantaneous and short-term emissions from stacks, process equipment, piping, etc., the TSCREEN model should be used in combination with A Workbook of Screening Techniques for Assessing Impacts of Toxic Air Pollutants-Revised.[8] The release scenario from the workbook that most accurately simulates the actual release should be selected and the appropriate analysis performed in order to determine the ambient impacts. The TSCREEN model uses the original SCREEN (Brode-88) algorithm to estimate cavity impacts. The methods described in Section 3.0 of this document should be used for all cavity estimations. For many unconventional releases, process and chemical-specific information is required to perform the modeling.

7.0 MODELING REPORTS

The results of an ambient air quality impact analysis must be submitted to the OAR for review and approval. The information submitted must be in report format and include sufficient information for the OAR to duplicate the results. All input information must be independently verifiable by the OAR and all assumptions made in the establishing of input parameters must be listed and supported. This section outlines the requirements for modeling reports submitted to the OAR.

A. Control Parameters

Model Selection

The report must identify the model used. If model selection deviated from the recommendations in this guidance, the report should include a justification for the use of the alternative model.

B. Input Parameters

1. Emission Rates

A table or list must be provided in the modeling report listing all worst-case and average emission rates used for each pollutant and averaging period. If existing or proposed permit restrictions were used to establish the emission rates used in the modeling, these must be listed and explained. Any emission factors used to calculate emissions rates must be listed, and the source of those factors must be identified. Source specific emissions data, such as stack sampling or CEM data, used to establish emission rates must be documented. Procedures and reference methodologies must be listed.

2. Stack Parameters

For each stack modeled, the height, exit diameter, exit velocity and exit temperature must be listed. Where calculations are necessary to establish these parameters, such calculations must be shown. Where this information is obtained from a source other than the OAR, the contact person and telephone number should be included.

3. Site Boundary Information

4. A plot plan showing the fenceline or property line of the facility must be provided.

5. Building Parameters

Building parameters including the height, width, length and projected width of every structure influencing each stack modeled must be listed. Calculations of projected widths must be shown. When computer programs are used to determine building dimensions, the software manufacturer, software name and version number and the input and output file listings must be provided. Drawings for each building must be included and must be sufficient to verify the parameters used in modeling.

6. Meteorological Conditions

Screening meteorological conditions used in modeling must be listed in the submitted report. If meteorological data collected on-site are used for refined modeling, those data should be submitted in ASCII format on a diskette or CD ROM, along with a description of the collection and processing of those data (e.g. monitor location, instrumentation, quality control, data processing). If meteorological conditions from representative local sites are used, the sources, sites**,** and dates of the data must be identified.

7. Receptor Grid

The receptor grid used in each of the different terrain regimes must be clearly explained. Any unique feature of the grid should be pointed out and explained. USGS 15′ or 7.5′ series topographical maps should be used to establish source locations. Source locations should be reported in UTM coordinates.

C. <u>Results</u>

1. Good Engineering Practice Stack Height

All calculations for GEP stack height must be shown. This includes calculations for each tier of every building near the stack. Drawings to scale or other documentation of actual structure parameters must be included.

2. Cavity Analysis

Information used to perform the cavity analysis must be shown, including data on all appropriate structures and tiers.

3. Simple Terrain Modeling

All results of simple terrain modeling for the downwash cavity and wake effects must be presented.

4. Complex Terrain Modeling

The results of complex terrain modeling results must be presented

D. <u>Documentation</u>

In addition to the documentation requirements already presented, modeling input and output files must be appended to the report and submitted on either computer diskette or CD. Copies of all runs must be included, not only those for which worst case results are presented. Each set of output must be identified (e.g. simple or complex terrain, single or multiple emissions source, pollutants, etc.). Maps showing the receptor grid used must also be included.

8.0 REFERENCES

1. U.S. EPA, Guideline On Air Quality Models (Revised), EPA-450/2-78-027R including Supplements A, B, and C, Research Triangle Park, NC, August 1995.

2. U.S. EPA, Guideline for Determination of Good Engineering Practice Stack Height (Revised), EPA-450/4-80-023R, Research Triangle Park, NC, June 1985.

3. U.S. EPA, "Stack Height Regulations; Final Rule", 50 Federal Register 27892, July 8, 1985, 40 CFR 51.

4. U.S. EPA, User's Guide to the Building Profile Input Program, Research Triangle Park, NC, October 1993.

5. U.S. EPA, Screening Procedures for Estimating the Air Quality Impact of Stationary Sources-Revised, EPA-450/R-92-019, Research Triangle Park, NC, October 1992.

6. U.S. EPA, "Proposal for Calculating Plume Rise for Stacks with Horizontal Releases or Rain Caps for Lookson Pigment, Newark, NJ." Memo from Joseph Tikvart, Chief, Source Receptor Analysis Branch to EPA Region II, Research Triangle Park, NC, July 9, 1993.

7. U.S. EPA, SCREEN3 Model User's Guide, EPA-450/4-92-006, Research Triangle Park, NC, September 1992.

8. U.S. EPA, Workbook of Screening Techniques for Assessing Impacts of Toxic Air Pollutants-Revised, EPA-454/R-92-024, Research Triangle Park, NC, December 1992.

APPENDIX A

REGULATION No. 22 ACCEPTABLE AMBIENT LEVELS (AALs) (Table I)

And AALs FOR SOURCES WITH THE LOWEST ACHEIVABLE EMISSIONS RATE (LAER) (Table II)

Table I Acceptable Ambient Levels (AALs) (μg/m^3)				
CHEMICAL NAME	**CAS #**	**1 hour**	**24 hour**	**Annual**
Acetaldehyde	75070		9	0.5
Acetamide	60355			0.05
Acetone	67641	60,000	30,000	
Acetonitrile	75058		60	
Acetophenone	98862		30	
2-Acetylaminofluorene	53963			0.0008
Acrolein	107028	0.1	0.02	0.002
Acrylamide	79061			0.0008
Acrylic Acid	79107	6,000	1	
Acrylonitrile	107131	200	2	0.01
Aldrin	309002	0.7	0.01	0.0002
Allyl Chloride	107051		1	
2-Aminoanthraquinone	117793			0.1
4-Aminobiphenyl	92671			0.0002
Ammonia	7664417	300	100	
Aniline	62533		1	0.6
o-Anisidine	90040			0.02
Antimony & compounds	7440360		0.1	0.02
Aramite	140578			0.1
Arsenic & compounds (inorganic)	7440382	0.2	0.1	0.0002
Arsine	7784421	200	0.05	
Asbestos	1332214			0.000004*
Azobenzene	103333			0.03
Barium	7440393		20	
Benzene	71432	200	10	0.1
Benzidine	92875			0.00002
Benzoic acid	65850		1,000	
Benzotrichloride	98077			0.0003
Benzyl chloride	100447	200		0.02
Beryllium & compounds	7440417		0.02	0.0004
Biphenyl	92524		20	
Bis (chloromethyl) ether	542881		1	0.00002
Bis (2-ethylhexyl) phthalate (DEHP)	117817		7	0.4
Boron and borates	7440428		30	
Bromates (including Potassium bromate)	15541454		1	0.007
Bromine & cmpds (except Hydrogen bromide & Bromates)	7726956			2
Bromodichloromethane	75274	10	7	0.06
Bromoform	75252	200		0.9
1,3-Butadiene	106990			0.006
Butyl benzyl phthalate	85687		70	7
Cadmium & compounds	7440439		0.2	0.0006
Calcium cyanamide	156627			1
Captan	133062		50	1
Carbaryl	63252		30	

Table I Acceptable Ambient Levels (AALs) (μg/m^3)				
CHEMICAL NAME	**CAS #**	**1 hour**	**24 hour**	**Annual**
Carbon disulfide	75150	6,000	700	
Carbon tetrachloride	56235	1,000	300	0.07
Carbonyl sulfide	463581	200		30
Catechol	120809	6000		0.5
Chloramben	133904		5	
Chlordane	57749		0.7	0.01
Chlorinated paraffins (avg length C12- C13, 60% chlorine)	108171262			0.04
Chlorine	7782505	200	30	0.2
Chlorine dioxide	10049044		0.2	
Chloroacetic acid	79118		7	0.00002
2-Chloroacetophenone	532274		0.03	
4-Chloroaniline	106478		1	0.01
Chlorobenzene	108907		7	
Chlorobenzilate	510156		7	0.07
1-Chloro-1,1-difluoroethane (CFC 142B)	75683		50,000	
Chlorodifluoromethane (HCFC-22)	75456		50,000	
Chloroform	67663	100	3	0.04
Chloromethyl methyl ether	107302			0.001
2-Chlorophenol	95578		2	
4-Chloro-o-phenylenediamine	95830			0.2
Chloropicrin	76062	30		2
Chloroprene	126998			1
p-Chloro-o-toluidine	95692			0.01
Chromium III (insoluble salts)	16065831		500	
Chromium VI - mists and aerosols	18540299		0.008	0.00008
Chromium VI – solid particulate	18540299		0.1	0.00008
Cobalt & compounds			0.03	0.0003
Coke oven emissions	8007452			0.002
Copper & compounds (except Copper cyanide)	7440508	100		2
p-Cresidine	120718			0.02
Cresols/Cresylic acid, isomers and mixtures (Methylphenols)	1319773			60
Cumene	98828		400	
Cupferron	135206			0.02
Cyanide & compounds (inorganic), except Hydrogen cyanide	57125	300		9
2,4-Diaminoanisole	615054			0.2
2,4-Diaminotoluene	95807			0.0009
Diazomethane	334883			0.8
Dibromochloromethane	124481		7	0.4
1,2-Dibromo-3-chloropropane	96128		0.2	0.0005
Dibutylphthalate	84742		30	
1,2-Dichlorobenzene	95501		30	
1,4-Dichlorobenzene (p-Dichlorobenzene)	106467	5,000	800	0.9
3,3'-Dichlorobenzidene	91941			0.003

Table I Acceptable Ambient Levels (AALs) (µg/m^3)				
CHEMICAL NAME	**CAS #**	**1 hour**	**24 hour**	**Annual**
Dichloro diphenyl dichloroethylene (DDE)	3547044			0.01
cis- 1,2-Dichloroethene	156592	300	100	
trans- 1,2-Dichloroethene	156605	800	7	
Dichloroethyl ether (Bis (chloroethyl) ether)	111444		100	0.003
2,4-Dichlorophenoxyacetic acid	94757		3	
1,3-Dichloropropene	542756		20	0.2
Dichlorvos	62737	20	0.5	0.01
Dieldrin	60571		0.02	0.0002
Diethanolamine	111422			20
Diethyl sulfate	64675			0.003
1,1-Difluoroethane (HCFC 152a)	75376		40,000	
3,3'-Dimethoxybenzidine	119904			0.0005
p-Dimethyl aminoazobenzene	60177			0.0008
n,n-Dimethyl aniline	121697		0.7	0.007
3,3'-Dimethyl benzidine	119937			0.00004
Dimethyl carbamoyl chloride	79447			0.0003
Dimethyl formamide	68122		30	
1,1-Dimethyl hydrazine	57147		0.5	0.005
1,2-Dimethyl hydrazine	540738		0.3	0.000006
2,4-Dimethylphenol	105679		7	
Dimethyl phthalate	131113		3,000	
Dimethyl sulfate	77781			0.0002
4,6-Dinitro-o-cresol	534521	1		
2,4-Dinitrophenol	51285	3	0.7	
2,4-Dinitrotoluene	121142		0.7	0.01
1,4-Dioxane (1,4-Diethyleneoxide)	123911	3,000		0.1
1,2-Diphenylhydrazine (Hydrazobenzene)	122667			0.005
Epichlorohydrin	106898	1,000	1	0.8
1,2-Epoxybutane	106887		20	
Ethyl acrylate	140885			0.5
Ethyl benzene	100414		1,000	
Ethyl carbamate (Urethane)	51796			0.003
Ethyl chloride (Chloroethane)	75003	40,000	10,000	
Ethylene dibromide (Dibromoethane)	106934			0.005
Ethylene dichloride (1,2-Dichloroethane)	107062			0.04
Ethylene glycol	107211	1,000	700	400
Ethylene glycol monobutyl ether	111762	10,000		1,000
Ethylene glycol monoethyl ether	110805	400	200	70
Ethylene glycol monoethyl ether acetate	111159	100		
Ethylene glycol monomethyl ether	109864	90	20	
Ethylene glycol monomethyl ether acetate	110496			90
Ethylene imine (Aziridine)	151564			0.00005
Ethylene oxide	75218		200	0.01
Ethylene thiourea	96457			0.08
Ethylidene dichloride (1,1-Dichloroethane)	75343			6
Fluorides & compounds, including Hydrogen		200		6

Table I Acceptable Ambient Levels (AALs) ($\mu g/m^3$)				
CHEMICAL NAME	**CAS #**	**1 hour**	**24 hour**	**Annual**
fluoride				
Formaldehyde	50000	50	40	0.08
Glutaraldehyde	111308			0.08
Heptachlor	76448		0.2	0.0008
Hexachlorobenzene	118741	3	0.3	0.002
Hexachlorobutadiene	87683		0.07	
Hexachlorocyclohexanes, technical grade & mixed isomers	608731			0.002
alpha-Hexchlorocyclohexane	319846			0.0006
beta-Hexchlorocyclohexane	319857	70	0.2	0.02
gamma-Hexachlorocyclohexane (Lindane)	58899	4	0.1	0.003
Hexachlorocyclopentadiene	77474		0.2	
Hexachloroethane	67721	60,000	0.3	
Hexamethylene-1,6-diisocyanate	822060		0.01	
Hexamethylphosphoramide	680319			0.00005
Hexane	110543		200	
Hydrazine	302012		5	0.0002
Hydrochloric acid (Hydrogen chloride)	7647010	2,000	20	9
Hydrogen bromide	10035106			20
Hydrogen cyanide	74908	300	3	
Hydrogen sulfide	7783064	40		10
Hydroquinone	123319		100	5
Isophorone	78591		70	40
Isopropanol	67630	3,000		
Lead Compounds, inorganic	7439921			0.08
Lead – tetraethyl lead	78002		0.00003	
Maleic anhydride	108316	10		2
Manganese & compounds	7439965		0.05	0.04
Mercury & compounds - elemental & inorganic	7439976	2	0.3	0.09
Mercury - methylmercury	22967926		0.03	0.003
Methanol	67561	30,000		4,000
Methoxychlor	72435		2	
Methyl bromide (Bromomethane)	74839	200	5	
Methyl chloride (Chloromethane)	74873	1,000	90	
Methyl chloroform (1,1,1-Trichloroethane)	71556	10,000	4,000	1,000
4,4-Methylene bis (2-chloroaniline)	101144			0.002
Methylene chloride (Dichloromethane)	75092	2,000	1,000	2
4,4-Methylenedianiline	101779	70	30	0.002
Methylene diphenyl diisocyanate	101688		0.6	
Methyl ethyl ketone (2-Butanone)	78933	10,000	1,000	
Methyl hydrazine	60344			0.003
Methyl iodide (Iodomethane)	74884	4,000		3
Methyl isobutyl ketone (Hexanone)	108101	30,000	300	
Methyl isocyanate	624839			0.4
Methyl methacrylate	80626		700	
Methyl tert butyl ether (MTBE)	1634044	7,000	3,000	

Table I Acceptable Ambient Levels (AALs) ($\mu g/m^3$)				
CHEMICAL NAME	**CAS #**	**1 hour**	**24 hour**	**Annual**
Michler's ketone (4,4'-Bis (dimethylamino) benzophenone)	90948			0.004
Fine mineral fibers				20
Molybdenum	7439-98-7		0.02	
Naphthalene	91203		3	0.3
Nickel and compounds, except Nickel subsulfide		6		0.004
Nickel subsulfide	12035722	6		0.002
Nitric acid	7697372	90		
Nitrobenzene	98953			2
4-Nitrobiphenyl	92933			0.00002
4-Nitrophenol	100027			0.1
2-Nitropropane	79469		20	0.2
N-Nitrosodi-n-butylamine	924163			0.0006
N-Nitrosodiethylamine	55185			0.00002
N-Nitrosodimethylamine	62759			0.00007
N-Nitrosodiphenylamine	86306			0.4
N-Nitrosdi-n-propylamine	621647	30		0.0005
N-Nitroso-n-methylethylamine	10595956			0.0002
N-Nitroso-n-methylurea	684935			0.00003
N-Nitrosomorpholine	59892			0.0005
N-Nitrosopiperidine	100754			0.0004
N-Nitrosopyrrolidine	930552			0.002
Parathion	56382		2	0.02
Pentachloronitrobenzene (Quintozene)	82688		1	0.1
Pentachlorophenol	87865		10	0.2
Phenol	108952	6,000	200	
p-Phenylenediamine	106503			0.2
Phosgene	75445	4		
Phosphine	7803512		0.3	
Phosphoric acid	7664382		10	7
Phosphorus	7723140	20	0.007	
Phthalic anhydride	85449			20
Polychlorinated biphenyls (PCBs), except Aroclor 1254	1336363		0.02	0.01
PCBs- Aroclor 1254	11097691		0.007	
Polychlorinated dibenzo dioxins (PCDDs), Polychlorinated dibenzo furans (PCDFs) and dioxin-like Polychlorinated biphenyls (PCBs)				3×10^{-8} **
Polycyclic Organic Matter				0.0009 ***
1,3-Propane sultone	1120714			0.001
beta-Propiolactone	57578			0.0002
Propionaldehyde	123386	4000		0.4
Propoxur (Baygon)	114261		1	0.01
Propylene	115071			3,000
Propylene dichloride (1,2-Dichloropropane)	78875	200	4	0.06
Propylene glycol	57556		30	

Table I Acceptable Ambient Levels (AALs) (µg/m³)				
CHEMICAL NAME	**CAS #**	**1 hour**	**24 hour**	**Annual**
Propylene glycol monomethyl ether (PGME)	107982		2,000	
Propylene oxide	75569	3,000	30	0.3
1,2-Propylenimine (2-Methyl aziridine)	75558			0.0001
Quinoline	91225			0.03
Quinone	106514			1
Selenium & compounds, except Hydrogen selenide and Selenium sulfide	7782492		2	0.5
Selenium – Hydrogen selenide	7783075	5	2	0.5
Selenium sulfide	7446346		2	0.005
Sodium hydroxide	1310932	8		5
Styrene	100425	20,000	1,000	100
Styrene oxide	96093			0.02
Sulfates		100		20
Sulfuric acid and Oleum	7664939	100		
1,1,1,2-Tetrachloroethane	630206			*0.1*
1,1,2,2-Tetrachloroethane	79345		3,000	0.2
Tetrachloroethylene (Perchloroethylene)	127184	1,000	300	0.2
Tetrachlorophenols	25167833			90
1,1,1,2-Tetrafluoroethane	811972		80,000	
Thioacetamide	62555			0.0006
Titanium tetrachloride	7550450		10	0.1
Toluene	108883	4,000	400	300
2,4-Toluene diamine (2,4-Diaminotoluene)	95807			0.0009
2,4-and 2,6-Toluene diisocyanate	584849		0.07	
o-Toluidine	95534			0.02
Toxaphene (Chlorinated camphene)	8001352	2	0.4	0.003
1,2,4-Trichlorobenzene	120821		3	
1,1,2-Trichloroethane	79005		1	0.6
Trichloroethylene	79016	10,000	500	0.5
Trichlorofluoromethane	75694		100	
2,4,5-Trichlorophenol	95954		30	
2,4,6-Trichlorophenol	88062			0.3
Triethylamine	121448	3,000	7	
Trifluralin	1582098		3	
2,2,4-Trimethylpentane	540841			200
Vanadium & compounds		0.2		
Vinyl acetate	108054		200	20
Vinyl bromide	593602		3	0.03
Vinyl chloride	75014	1,000	100	0.2
Vinylidene chloride (1,1-Dichloroethylene)	75354		80	0.2
Xylenes, isomers and mixtures	1330207	4,000	3,000	400
Zinc & compounds			100	30

*Asbestos units are fibers/cubic meter.
**PCDD AAL is in terms of 2,3,7,8-tetrachlorodibenzodioxin equivalents, calculated as specified in the Rhode Island Air Toxics Guidelines.
***Polycyclic Organic Matter AAL is in terms of benzo(a)pyrene equivalents, calculated as specified in the Rhode Island Air Toxics Guidelines.

Table II Acceptable Ambient Levels (AALs) with LAER (µg/m^3)				
CHEMICAL NAME	**CAS #**	**1 hour**	**24 hour**	**Annual**
Acetaldehyde	75070		9	5
Acetamide	60355			0.5
Acetone	67641	60,000	30,000	
Acetonitrile	75058		60	
Acetophenone	98862		30	
2-Acetylaminofluorene	53963			0.008
Acrolein	107028	0.1	0.02	0.002
Acrylamide	79061			0.008
Acrylic Acid	79107	6,000	1	
Acrylonitrile	107131	200	2	0.1
Aldrin	309002	0.7	0.01	
Allyl Chloride	107051		1	
2-Aminoanthraquinone	117793			1
4-Aminobiphenyl	92671			0.002
Ammonia	7664417	300	100	
Aniline	62533		1	6
o-Anisidine	90040			0.2
Antimony & compounds	7440360		0.1	0.02
Aramite	140578			1
Arsenic & compounds (inorganic)	7440382	0.2	0.1	0.002
Arsine	7784421	200	0.05	
Asbestos	1332214			0.00004*
Azobenzene	103333			0.3
Barium	7440393		20	
Benzene	71432	200	10	1
Benzidine	92875			0.0002
Benzoic acid	65850		1,000	
Benzotrichloride	98077			0.003
Benzyl chloride	100447	200		0.2
Beryllium & compounds	7440417		0.02	0.004
Biphenyl	92524		20	
Bis (chloromethyl) ether	542881		1	0.0002
Bis (2-ethylhexyl) phthalate (DEHP)	117817		7	4
Boron and borates	7440428		30	
Bromates (including Potassium bromate)	15541454		1	0.07
Bromine & compounds (except Hydrogen bromide & Bromates)	7726956			2
Bromodichloromethane	75274	10	7	0.6
Bromoform	75252	200		9
1,3-Butadiene	106990			0.06
Butyl benzyl phthalate	85687		70	7
Cadmium & compounds	7440439		0.2	0.006
Calcium cyanamide	156627			1
Captan	133062		50	10
Carbaryl	63252		30	

Table II Acceptable Ambient Levels (AALs) with LAER ($\mu g/m^3$)				
CHEMICAL NAME	**CAS #**	**1 hour**	**24 hour**	**Annual**
Carbon disulfide	75150	6,000	700	
Carbon tetrachloride	56235	1,000	300	0.7
Carbonyl sulfide	463581	200		30
Catechol	120809	6000		0.5
Chloramben	133904		5	
Chlordane	57749		0.7	0.1
Chlorinated paraffins (avg length C12- C13, 60% chlorine)	108171262			0.4
Chlorine	7782505	200	30	0.2
Chlorine dioxide	10049044		0.2	
Chloroacetic acid	79118		7	0.00002
2-Chloroacetophenone	532274		0.03	
4-Chloroaniline	106478		1	0.01
Chlorobenzene	108907		7	
Chlorobenzilate	510156		7	0.07
1-Chloro-1,1-difluoroethane (CFC 142B)	75683		50,000	
Chlorodifluoromethane (HCFC-22)	75456		50,000	
Chloroform	67663	100	3	0.4
Chloromethyl methyl ether	107302			0.01
2-Chlorophenol	95578		2	
4-Chloro-o-phenylenediamine	95830			2
Chloropicrin	76062	30		2
Chloroprene	126998			1
p-Chloro-o-toluidine	95692			0.1
Chromium III (insoluble salts)	16065831		500	
Chromium VI - mists and aerosols	18540299		0.008	0.0008
Chromium VI – solid particulate	18540299		0.1	0.0008
Cobalt & compounds			0.03	0.0003
Coke oven emissions	8007452			0.02
Copper & compounds (except Copper cyanide)	7440508	100		2
p-Cresidine	120718			0.2
Cresols/Cresylic acid, isomers and mixtures (Methylphenols)	1319773			60
Cumene	98828		400	
Cupferron	135206			0.2
Cyanide & compounds (inorganic), except Hydrogen cyanide	57125	300		9
2,4-Diaminoanisole	615054			2
2,4-Diaminotoluene	95807			0.009
Diazomethane	334883			0.8
Dibromochloromethane	124481		7	0.4
1,2-Dibromo-3-chloropropane	96128		0.2	0.005
Dibutylphthalate	84742		30	
1,2-Dichlorobenzene	95501		30	
1,4-Dichlorobenzene (p-Dichlorobenzene)	106467	5,000	800	0.9
3,3'-Dichlorobenzidene	91941			0.03

Table II Acceptable Ambient Levels (AALs) with LAER ($\mu g/m^3$)				
CHEMICAL NAME	**CAS #**	**1 hour**	**24 hour**	**Annual**
Dichloro diphenyl dichloroethylene (DDE)	3547044			0.1
cis- 1,2-Dichloroethene	156592	300	100	
trans- 1,2-Dichloroethene	156605	800	7	
Dichloroethyl ether (Bis (chloroethyl) ether)	111444		100	0.03
2,4-Dichlorophenoxyacetic acid	94757		3	
1,3-Dichloropropene	542756		20	2
Dichlorvos	62737	20	0.5	0.1
Dieldrin	60571		0.02	
Diethanolamine	111422			20
Diethyl sulfate	64675			0.03
1,1-Difluoroethane (HCFC 152a)	75376		40,000	
3,3'-Dimethoxybenzidine	119904			0.005
p-Dimethyl aminoazobenzene	60177			0.008
n,n-Dimethyl aniline	121697		0.7	0.02
3,3'-Dimethyl benzidine	119937			0.0004
Dimethyl carbamoyl chloride	79447			0.003
Dimethyl formamide	68122		30	
1,1-Dimethyl hydrazine	57147		0.5	0.05
1,2-Dimethyl hydrazine	540738		0.3	0.00006
2,4-Dimethylphenol	105679		7	
Dimethyl phthalate	131113		3,000	
Dimethyl sulfate	77781			0.002
4,6-Dinitro-o-cresol	534521	1		
2,4-Dinitrophenol	51285	3	0.7	
2,4-Dinitrotoluene	121142		0.7	0.1
1,4-Dioxane (1,4-Diethyleneoxide)	123911	3,000		1
1,2-Diphenylhydrazine (Hydrazobenzene)	122667			0.05
Epichlorohydrin	106898	1,000	1	8
1,2-Epoxybutane	106887		20	
Ethyl acrylate	140885			0.5
Ethyl benzene	100414		1,000	
Ethyl carbamate (Urethane)	51796			0.03
Ethyl chloride (Chloroethane)	75003	40,000	10,000	
Ethylene dibromide (Dibromoethane)	106934			0.05
Ethylene dichloride (1,2-Dichloroethane)	107062			0.4
Ethylene glycol	107211	1,000	700	400
Ethylene glycol monobutyl ether	111762	10,000		1,000
Ethylene glycol monoethyl ether	110805	400	200	700
Ethylene glycol monoethyl ether acetate	111159	100		
Ethylene glycol monomethyl ether	109864	90	20	
Ethylene glycol monomethyl ether acetate	110496			90
Ethylene imine (Aziridine)	151564			0.0005
Ethylene oxide	75218		200	0.1
Ethylene thiourea	96457			0.8
Ethylidene dichloride (1,1-Dichloroethane)	75343			6
Fluorides & compounds, including Hydrogen fluoride		200		6

Table II Acceptable Ambient Levels (AALs) with LAER ($\mu g/m^3$)				
CHEMICAL NAME	**CAS #**	**1 hour**	**24 hour**	**Annual**
Formaldehyde	50000	50	40	0.8
Glutaraldehyde	111308			0.08
Heptachlor	76448		0.2	0.008
Hexachlorobenzene	118741	3	0.3	0.02
Hexachlorobutadiene	87683		0.07	
Hexachlorocyclohexanes, technical grade & mixed isomers	608731			0.02
alpha-Hexchlorocyclohexane	319846			0.006
beta-Hexchlorocyclohexane	319857	70	0.2	0.02
gamma-Hexachlorocyclohexane (Lindane)	58899	4	0.1	
Hexachlorocyclopentadiene	77474		0.2	
Hexachloroethane	67721	60,000	0.3	
Hexamethylene-1,6-diisocyanate	822060		0.01	
Hexamethylphosphoramide	680319			0.0005
Hexane	110543		200	
Hydrazine	302012		5	0.002
Hydrochloric acid (Hydrogen chloride)	7647010	2,000	20	9
Hydrogen bromide	10035106			20
Hydrogen cyanide	74908	300	3	
Hydrogen sulfide	7783064	40		10
Hydroquinone	123319		100	5
Isophorone	78591		70	40
Isopropanol	67630	3,000		
Lead Compounds, inorganic	7439921			0.8
Lead – tetraethyl lead	78002		0.00003	
Maleic anhydride	108316	10		2
Manganese & compounds	7439965		0.05	0.04
Mercury & compounds - elemental & inorganic	7439976	2	0.3	0.09
Mercury - methylmercury	22967926		0.03	0.003
Methanol	67561	30,000		4,000
Methoxychlor	72435		2	
Methyl bromide (Bromomethane)	74839	200	5	
Methyl chloride (Chloromethane)	74873	1,000	90	
Methyl chloroform (1,1,1-Trichloroethane)	71556	10,000	4,000	1,000
4,4-Methylene bis (2-chloroaniline)	101144			0.02
Methylene chloride (Dichloromethane)	75092	2,000	1,000	20
4,4-Methylenedianiline	101779	70	30	0.02
Methylene diphenyl diisocyanate	101688		0.6	
Methyl ethyl ketone (2-Butanone)	78933	10,000	1,000	
Methyl hydrazine	60344			0.03
Methyl iodide (Iodomethane)	74884	4,000		3
Methyl isobutyl ketone (Hexanone)	108101	30,000	300	
Methyl isocyanate	624839			0.4
Methyl methacrylate	80626		700	
Methyl tert butyl ether (MTBE)	1634044	7,000	3,000	
Michler's ketone	90948			0.04

Table II Acceptable Ambient Levels (AALs) with LAER ($\mu g/m^3$)				
CHEMICAL NAME	**CAS #**	**1 hour**	**24 hour**	**Annual**
(4,4'-Bis (dimethylamino) benzophenone)				
Fine mineral fibers				20
Molybdenum	7439-98-7		0.02	
Naphthalene	91203		3	0.3
Nickel and compounds, except Nickel subsulfide		6		0.04
Nickel subsulfide	12035722	6		0.02
Nitric acid	7697372	90		
Nitrobenzene	98953			2
4-Nitrobiphenyl	92933			0.00002
4-Nitrophenol	100027			0.1
2-Nitropropane	79469		20	0.2
N-Nitrosodi-n-butylamine	924163			0.006
N-Nitrosodiethylamine	55185			0.0002
N-Nitrosodimethylamine	62759			0.0007
N-Nitrosodiphenylamine	86306			4
N-Nitrosdi-n-propylamine	621647	30		0.005
N-Nitroso-n-methylethylamine	10595956			0.002
N-Nitroso-n-methylurea	684935			0.0003
N-Nitrosomorpholine	59892			0.005
N-Nitrosopiperidine	100754			0.004
N-Nitrosopyrrolidine	930552			0.002
Parathion	56382		2	0.02
Pentachloronitrobenzene (Quintozene)	82688		1	0.01
Pentachlorophenol	87865		10	2
Phenol	108952	6,000	200	
p-Phenylenediamine	106503			0.2
Phosgene	75445	4		
Phosphine	7803512		0.3	
Phosphoric acid	7664382		10	7
Phosphorus	7723140	20	0.007	
Phthalic anhydride	85449			20
Polychlorinated biphenyls (PCBs), except Aroclor 1254	1336363		0.02	0.1
PCBs- Aroclor 1254	11097691		0.007	
Polychlorinated dibenzo dioxins (PCDDs), Polychlorinated dibenzo furans (PCDFs) and dioxin-like Polychlorinated biphenyls (PCBs)				3×10^{-7} **
Polycyclic Organic Matter				0.009***
1,3-Propane sultone	1120714			0.01
beta-Propiolactone	57578			0.002
Propionaldehyde	123386	4000		0.4
Propoxur (Baygon)	114261		1	0.01
Propylene	115071			3,000
Propylene dichloride (1,2-Dichloropropane)	78875	200	4	0.6
Propylene glycol	57556		30	
Propylene glycol monomethyl ether (PGME)	107982		2,000	

Table II Acceptable Ambient Levels (AALs) with LAER ($\mu g/m^3$)				
CHEMICAL NAME	**CAS #**	**1 hour**	**24 hour**	**Annual**
Propylene oxide	75569	3,000	30	3
1,2-Propylenimine (2-methyl aziridine)	75558			0.001
Quinoline	91225			0.03
Quinone	106514			1
Selenium & compounds, except Hydrogen selenide and Selenium sulfide	7782492		2	0.5
Selenium – Hydrogen selenide	7783075	5	2	
Selenium sulfide	7446346		2	0.005
Sodium hydroxide	1310932	8		5
Styrene	100425	20,000	1,000	100
Styrene oxide	96093			0.2
Sulfates		100		20
Sulfuric acid and Oleum	7664939	100		
1,1,1,2-Tetrachloroethane	630206			1
1,1,2,2-Tetrachloroethane	79345		3,000	0.2
Tetrachloroethylene (Perchloroethylene)	127184	1,000	300	2
Tetrachlorophenols	25167833			90
1,1,1,2-Tetrafluoroethane	811972		80,000	
Thioacetamide	62555			0.006
Titanium tetrachloride	7550450		10	0.1
Toluene	108883	4,000	400	300
2,4-Toluene diamine (2,4-Diaminotoluene)	95807			0.009
2,4-and 2,6-Toluene diisocyanate	584849		0.07	
o-Toluidine	95534			0.2
Toxaphene (Chlorinated camphene)	8001352	2	0.4	0.03
1,2,4-Trichlorobenzene	120821		3	
1,1,2-Trichloroethane	79005		1	0.6
Trichloroethylene	79016	10,000	500	5
Trichlorofluoromethane	75694		100	
2,4,5-Trichlorophenol	95954		30	
2,4,6-Trichlorophenol	88062			3
Triethylamine	121448	3,000	7	
Trifluralin	1582098		3	
2,2,4-Trimethylpentane	540841			200
Vanadium & compounds		0.2		
Vinyl acetate	108054		200	20
Vinyl bromide	593602		3	0.03
Vinyl chloride	75014	1,000	100	2
Vinylidene chloride (1,1-Dichloroethylene)	75354		80	0.2
Xylenes, isomers and mixtures	1330207	4,000	3,000	400
Zinc & compounds			100	30

*Asbestos units are fibers/cubic meter.
**PCDD AAL is in terms of 2,3,7,8-tetrachlorodibenzodioxin equivalents, calculated as specified in the Rhode Island Air Toxics Guidelines.
***Polycyclic Organic Matter AAL is in terms of benzo(a)pyrene equivalents, calculated as specified in the Rhode Island Air Toxics Guidelines.

APPENDIX B

CHECKLIST FOR REFINED MODELING

CONTROL PARAMETERS

1. Model Selection

   An appropriate model must be chosen. ISC-PRIME is appropriate for almost all refined modeling.

2. Averaging Time

   The averaging period must be the same as that used for the AAL of interest.

3. Urban/Rural Classification

   The urban/rural designation must be confirmed through review of topographic maps.

4. Terrain Type

   The default regulatory option in ISC-PRIME must be selected for all refined modeling runs.

SOURCE PARAMETERS

1. Emission Rate

   The emission rate must be correct and in the appropriate units.

2. Source Location

   A site plan should be used to confirm that the coordinates of the source(s) are correct.

3. Base Elevation

   A topographic map should be used to confirm that the base elevation of the source(s) is correct.

4. Stack Height and Release Height

   The heights for all stacks and other releases must be measured from the same point.

5. Stack Exit Temperature

   Confirm that the stack exit temperature is correctly imputed in degrees Kelvin.

6. Stack Exit Diameter

   The exit diameter must be the inside diameter of the stack

7. Flow Rate/Exit Velocity

   The flow rate through the stacks must be confirmed. The calculation of exit velocity must be confirmed from the diameter and flow rate values.

8. Stack Conditions

Traditional point sources are vertically-emitting, unobstructed and have a release height greater than 1.2 times the building on which they are placed. Special allowances must be made for horizontal stacks and stacks with rain caps (Section 5.3). Stacks with effective heights less than 1.2 times the height of the building on which they are placed might have to be treated as volume sources.

9. Building Downwash

A GEP analysis must be performed in order to determine if building downwash effects are possible around a source. If downwash is possible, the appropriate building dimensions must be used in the modeling.

10. Initial Dimensions for Volume and Area Sources

The initial lateral and vertical dimensions for volume sources and initial lateral dimension for area sources must be confirmed.

11. Source Groups

All sources must be accounted for in the output.

RECEPTOR GRID

1. Receptor Locations

The receptor grid must extend beyond the property boundary and the receptors must extend far enough and be spaced close enough together to ensure that the maximum impact is predicted. Receptor spacing should never be greater than 200 meters.

2. Receptor Elevations

A topographic map should be used to check that the receptor elevations are correct.

3. Grid Orientation

The receptor grid must be oriented exactly to true north.

METEOROLOGICAL PARAMETERS

1. Input File

The input file must match the year being modeled and must contain average hourly meteorological data.

2. Meteorological Data Station

The meteorological data station must be either that at Green State Airport, a representative meteorological site, or located on-site. The anemometer height must be correctly entered in the modeling input file. The anemometer at Green State Airport is at 6.1 m.

OUTPUT

1. Invalid Receptors

   For ISC-PRIME runs, the model output must be checked for invalid receptors, i.e., within $3L_b$ of the source. These receptors must be eliminated from consideration.

2. Maximum Off-Property Impact

   The maximum off-property impact from five years of meteorological data must be confirmed by reviewing the model output.

3. Cavity Analysis

   An evaluation of the source should be performed in order to determine if a cavity analysis is applicable.

4. Conversions

   All conversions, e.g., from concentration per mass/time to allowable mass/time, should be checked thoroughly.

Appendix F – Task Force Recommendations Implementation Schedule

Statutory Recommendations -The Task Force determined that there were no revisions needed to the state statute concerning the Air Pre-construction program.

Appendix F-1

Regulatory Recommendations Implementation Schedule

No.	Recommendation	Implementation Date
	Backlog Reduction	
1	Super Application – DEM will modify the regulations to allow facilities to submit more comprehensive permit applications including a proposed permit.. DEM will also need to develop guidance materials along with the regulations that outlines the content of these applications. These applications will include more detailed analyses than are required for typical applications, including air quality modeling and BACT analysis. In exchange for a more comprehensive application these projects would be assigned to the first available staff person for review and processed shortly after they were received. Part of DEM's detailed review will have been conducted by the applicant and should minimize DEM's review time.	DEM will begin a pilot program beginning 7/1/02 to assess the program. Full program implementation to begin 7/1/03.
2	General and Temporary Permits – a. DEM will develop general permits or permits by rule for small degreasers, drycleaners, emergency generators and future regulatory source categories that regulates many facilities and use technology requirements to determine compliance. b. DEM will also evaluate self-certification opportunities that could be used in an Environmental Results Program for facilities, instead of general permits.	a. Start process June 2002 Finish in June 2003 b. March 2003
3	Pre-Review of Applications - DEM should pre-review applications and categorize them, possibly into easy, medium and hard applications. Or DEM should categorize applications based on their potential to emit. The applications that pose a greater environmental or health concern should be reviewed more closely or should be required to submit a higher level of documentation. This recommendation needs further discussion. DEM will convene a working group to discuss this recommendation.	June 2003
	Regulation Flexibility	
1	DEM should consider evaluating BACT from a facility standpoint and not from an individual piece of equipment standpoint. There may be different record keeping and monitoring requirements and different emission and operational limits set on these pieces of equipment.	FY 04
2	DEM should clarify when a BACT or modeling analysis is required when a new piece of air pollution control equipment replaces an existing piece of equipment that results in a reduction in emissions.	FY 04
	Thresholds	
1	DEM should examine if there should be different threshold standards for sources that are intermittent emitters.	June 04
2	DEM should review different threshold time-periods, instead of just relying on an hourly time-period. Toxicity could also be a factor when DEM considers changing thresholds.	June 04
	Landfill Issues	
1	DEM would work with the RI Resource Recovery Corporation directly and evaluate our regulations to determine if they are comprehensive enough to handle and fairly treat all the problems associated with landfills, closed landfills and recyclers.	Ongoing

Appendix F-2

Policy Recommendations Implementation Schedule

No.	Recommendation	Implementation Date
	Application Processing Sequencing	
1	DEM should process applications from new sources of pollution before it works on existing sources of pollution that are filing an application after the fact.	June 03

Appendix F-3

Administrative Recommendations Implementation Schedule

<table>
<tr><th>No</th><th>Recommendation</th><th>Imple-mention Date</th><th>Responsible Office</th></tr>
<tr><td colspan="4">Process / Efficiency</td></tr>
<tr><td colspan="4">Phased Permits</td></tr>
<tr><td>1</td><td>DEM should negotiate a time-line at the beginning of the process for reviewing an application for phased permits. The facility needs to provide its time-line at the beginning of the submission for this to work..</td><td>September 2002</td><td>OAR</td></tr>
<tr><td colspan="4">Review Process</td></tr>
<tr><td>1</td><td>DEM will convene a small group of people and evaluate the following recommendations and report their findings to the Director in six months:
a. DEM should review the “first come/first served” policy. The following criteria, at a minimum, should be evaluated for a system other than first come/first served: the difficulty in reviewing the application, the potential to emit, and the level of environmental and/or public health concern.
b. DEM should evaluate developing tiered application information requirements. The purpose of the tiered approach is to increase the amount of information that is submitted to DEM, thus improving application quality. More complete applications will decrease the amount of time DEM needs to review the applications. DEM staff is tasked to determine the “bright lines” between categories and would develop checklists for the tiers. Application forms would be modified to support this effort. Three possible tiers could include:
♦ Applications submitted from small businesses that would require a minimal amount of information to begin the review process,
♦ Applications that are not submitted by small businesses but contain less information that that required by the “Super Application”.
♦ “Super Applications” that would include supplementary information and these applications would receive priority review.</td><td>Start Process June 03

Start Process June 03</td><td>OAR</td></tr>
<tr><td>2</td><td>DEM currently uses the Office of Technical and Customer Assistance for coordinating permits that cross multiple environmental programs. Participants agreed that the process is working and the existing process should remain in effect.</td><td>On-going</td><td>OAR / OTCA</td></tr>
<tr><td>3</td><td>Facility-wide Permits, Emission or Process Caps- DEM is prepared to work with facilities to implement these permits and caps. Since there has not been a demand for these permits, the program will handle these in a case by case basis. If a demand develops for these permits, DEM will revise its regulations to handle these permits. DEM is experienced in emission caps and will continue to use these caps when requested.</td><td>On-going</td><td>OAR</td></tr>
<tr><td>4</td><td>The air-permitting program supports the use of pre-application meetings to clarify issues in the permit process.</td><td>On-going</td><td>OAR</td></tr>
<tr><td colspan="4">Outreach / Web Tools</td></tr>
<tr><td>1</td><td>The Office of Technical and Customer Assistance will update the “Guide to Environmental Permits and Approvals” that was written in 1989 and briefly describes the DEM review process, application information requirements and guidance on applicability requirements.</td><td>January 03</td><td>OTCA</td></tr>
<tr><td>2</td><td>a. In order to provide additional information to the regulated community, DEM will include on its website links to the major state and EPA clearinghouses along with permitting contact information in the other NESCAUM states.
b. DEM will also pursue setting up a regional BACT Clearinghouse. DEM will raise this issue with the NESCAUM Board of Directors.</td><td>September 02</td><td>OAR</td></tr>
<tr><td>3</td><td>DEM will post copies of permits, in a PDF format, on the DEM homepage. DEM will also post an index of all permits issued by the program to facilitate information requests on past permits. The program will also speak to the DEM website contact, to determine if a searchable index of BACT decisions could be installed on the DEM website.</td><td>September 02</td><td>OAR / OTCA</td></tr>
<tr><td>4</td><td>Air modeling guidance is in the process of being revised. DEM will post the revised guidance on the department website when the document is finalized.</td><td>August 02</td><td>OAR / OTCA</td></tr>
<tr><td>5</td><td>DEM will evaluate when Pre-construction applications will be able to be submitted in an electronic format.</td><td>FY 04</td><td>IMU /OAR</td></tr>
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